

# modern machine shop

## FEATURES IN BRIEF

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## RELIEF GRINDING

See Page 102

## DRIVING RIVETS

See Page 128

NOVEMBER  
1957

### CONVERSION CHART

#### WILSON

Relationships between values determined by "ROCKWELL", "ROCKWELL", "Superficial" and "TUNING" Hardness Scales and values determined on other scales.

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THE WORLD'S STANDARD  
OF HARDNESS TESTING  
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A FULL WILSON LINE TO MEET EVERY  
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- SPECIAL
- SUPERFICIAL
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**WILSON**  
MECHANICAL INSTRUMENT DIVISION  
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## Clear, transparent Cleartex Oil boosts production, adds tool life for Triangle Screw Products, Dayton, Ohio

Triangle Screw Products employ a sizable battery of automatics to produce screw machine parts of various shapes and sizes, in metals ranging from aluminum to stainless steels. For over fifteen years Triangle has used *Texaco Cleartex Oil* for all this work with the exception of the stainless steels which are machined with *Texaco Sultex Cutting Oil*.

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There's a complete line of *Texaco Cut-*

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**LUBRICATION IS A MAJOR FACTOR IN COST CONTROL**

(parts, inventory, production, downtime, maintenance)

For more data circle 302 on Reader Service Card



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# modern machine shop

Vol. 30, No. 6, November, 1957

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Member



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IN THIS ISSUE

# modern machine shop

## Features in

### RELIEF GRINDING TWIST DRILLS FOR SPOTFACING

**By Ira S. Roberts**

The Burroughs Adding Machine Company's Plymouth, Michigan plant utilizes a universal form relieving fixture and grinder to grind twist drills with integral pilots for spotfacing stamped parts.

**Page 102**

### THAT BIG STEP FROM SUPERVISOR TO EXECUTIVE

**By Alfred M. Cooper**

According to the author, this transition point is becoming increasingly important as our industries continue to expand and top-flight executive material becomes more difficult to obtain.

**Page 108**

### FLAME-PLATED VALVE TAKES TO THE AIR

Unique coating process solves wear problem in producing valves for Lockheed's F-104A Starfighter.

**Page 120**

### UNUSUAL LATHE SETUP FOR MILLING AND JIG BORING

**By Andrew Mihalko**

Boring head is used in conjunction with different types of simple-to-make faceplates for machining workpieces.

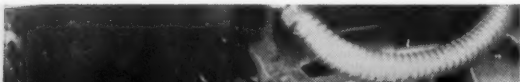
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### HARD-FACING SPUR GEARS

**By Bartlett West**

The use of an iron-base electrode in hard-facing ball mill gears is discussed.

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# in this issue

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## CONTROLLED HARDENING OF STEEL PARTS

A furnace featuring positive atmospheric control allows for hardening of parts of various shapes without scale formation or decarburization.

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## DRIVING TITANIUM RIVETS

**By Thomas A. Dickinson**

"Hot squeezers" equipped with temperature-sensing controls do consistently good work in the riveting of titanium at the Boeing Airplane Company, Seattle, Washington.

**Page 128**

## MACHINING STAINLESS STEEL

**By G. J. Stevens**

This case history points out how tool life was increased in knurling a Type 303 stainless steel round on an automatic.

**Page 136**

## MULTIPLE-HOLE DRILLING OF MISSILE PARTS

An interesting setup used at the Device Manufacturing Company, North Hollywood, California, provides for the simultaneous drilling of eight precision holes from four sides of each missile part.

**Page 138**

## ABSTRACTS OF PAPERS PRESENTED AT CINCINNATI TECHNICAL ACTIVITIES SEMINAR

Highlights are presented of the subjects discussed at a two-day session held early last month at The Cincinnati Milling Machine Company, Cincinnati, Ohio, for metalworking production executives and management and sales personnel.

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modern machine shop



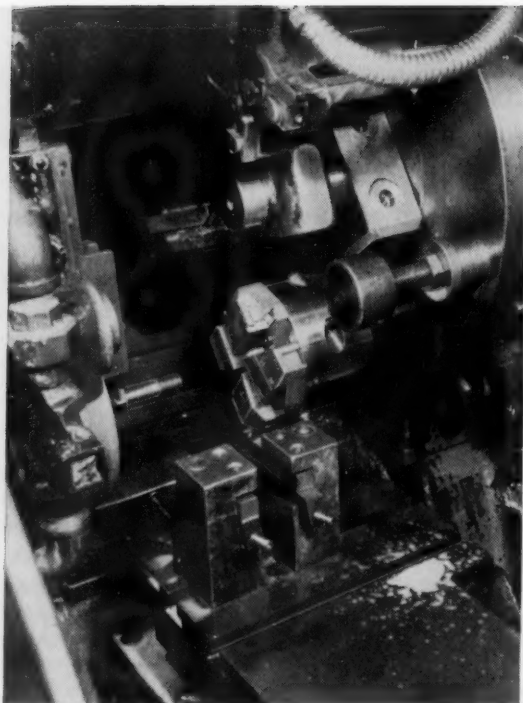
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tolerances  
on*

**SINGLE - SPINDLE**

*automatic*



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modern machine shop

November, 1957

**Whistler Magna-Dies open the way to big savings**

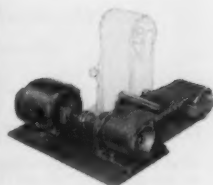
*Over \$2500 saved on these four typical jobs... Here's a specific*

OVER  
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GRINDERS  
IN SERVICE

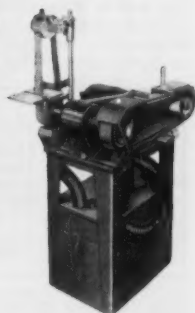
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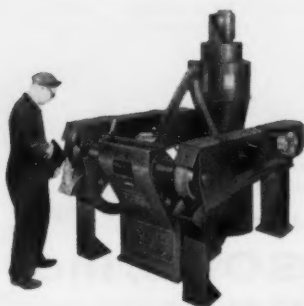
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4" ABRASIVE  
BELT GRINDER

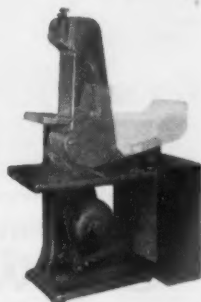


MODEL 50-DD  
Abrasive Belt Grinder  
with DusKolektor



VARIABLE SPEED LATHE  
with Backstands and  
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Grinding and Finishing

MODEL VH-6WP  
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Belt Grinder for  
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"America's most complete line of grinding, polishing, and buffing equipment"

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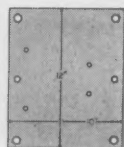
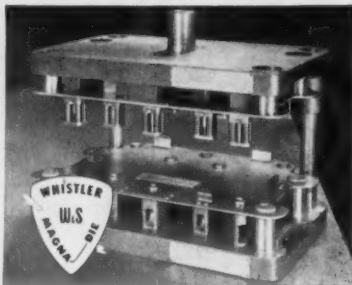
to die cast aluminum

# Whistler Magna-Dies open the way to big savings

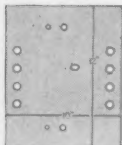
**Over \$2500 saved on these four typical jobs... Here's a specific example showing how Whistler Magnetic Perforating Dies are used and re-used to push die costs down to a rock bottom low:**

## \$106 SAVED ON JOB NO. 1... EVEN INITIAL INVESTMENT IS LESS

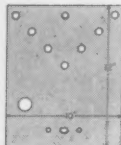
This Whistler Magna-Die unit includes a 12" x 14" die set, 10 punch and 10 die retainers, 10 punches, 10 die bushings, 10 strippers, 3 gages and one set of templets. The complete price with templets jig bored and gages mounted for producing the 10-hole part shown at the right: \$819.00. The approximate cost of a custom die to do the same job: \$925.00. From the very start, you start to save with a Whistler Magna-Die.



4 holes 1/2" dia.  
2 holes 3/8" dia.  
4 holes 3/16" dia.  
Dim. tolerance  
±.0005"



8 holes 1/2" dia.  
2 holes 3/8" dia.  
2 holes 3/16" dia.  
1 oval hole  
3/8" x 1/2"  
Dim. tolerance  
±.0005"



1 hole 31/32" dia.  
7 holes 1/2" dia.  
1 hole 3/8" dia.  
2 holes 3/16" dia.  
1 oval hole  
3/8" x 1/2"  
Dim. tolerance  
±.0005"



6 holes 1/2" dia.  
2 holes 3/8" dia.  
4 holes 3/16" dia.  
1 oval hole  
3/8" x 1/2"  
Dim. tolerance  
±.0005"

## \$710 SAVED ON JOB NO. 2

All of the original punch and die parts (with the exception of 2 punches, 2 bushings and 2 strippers) are re-used here. The additional tooling required, plus bored templets with gages mounted, cost \$389.79. The approximate cost of a custom die to produce this part: \$1100. Savings pile up with each succeeding job...\$816 so far.

## \$793 SAVED ON JOB NO. 3

Through the use of another punch and die retainer unit, a 1 1/2" punch, die bushing and stripper plus a new set of bored templets with gages, this part is produced at a die cost of \$246.81. In this case, the cost of a custom die would amount to approximately \$1040.00. Savings now reach \$1609.

## \$925 SAVED ON JOB NO. 4

As more Whistler punch and die parts are accumulated, die costs for each succeeding job usually go down even further. Here, for example, only a new set of templets, jig bored to the 13-hole pattern, is needed. The cost: \$163.55. A custom die for this job would run approximately \$1089. Total savings for these first four jobs alone amount to approx. \$2535.

## EACH JOB CAN BE RE-RUN AT ADDED SAVINGS, TOO!

Punch and die parts can be quickly re-assembled to re-run any one of these four jobs. All it takes is approximately 10 minutes for press changeover. Whistler Magna-Dies cut downtime and remove production bottlenecks by avoiding the extra time required to obtain custom dies. They can be used on practically any press with a minimum shut height of 9 1/2" for perforating materials up to and including 1/4" mild steel.



GET COMPLETE DETAILS AND PRICES BY WRITING FOR CATALOG M-551

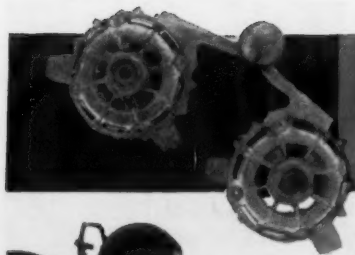
# S. B. WHISTLER & SONS, Inc.

740 MILITARY ROAD, BUFFALO 23, N. Y.

Manufacturers of Adjustable, Magnetic and Custom Built Dies for All Industry

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*to die cast aluminum  
motor end-bells . . .*



**ABOVE:** Operator removing end bell casting from one of Emerson-Electric's new Model 400-N Clevelands. End bell is 6 1/4" in dia. Weight of shot approx. 2 1/2 lbs. A close up view of the "as-cast" part is also shown.

**BELOW:** Cleveland Model 400-N with aluminum shot end. Also available as a hot chamber, zinc machine. Has 36" x 40" die plates; 400 tons locking pressure strain gage tested.

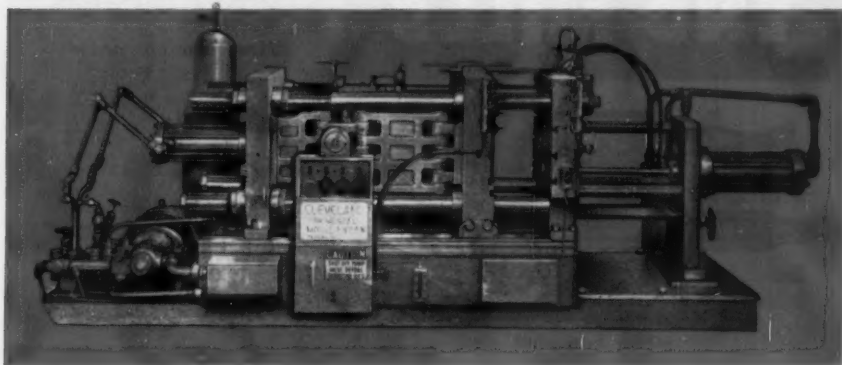
## **EMERSON-ELECTRIC AGAIN SELECTS MODEL 400-N CLEVELANDS**

The Emerson Electric Mfg. Co., manufacturer of Emerson-Electric motors and appliances, operates two Model 400-N Clevelands in their St. Louis plant, to cast aluminum motor end-bells.

Based on the excellent performance of these Clevelands, Emerson-Electric has recently installed *two more* Model 400-N Clevelands in their new, modern plant at Paragould, Ark. These new Clevelands are also producing aluminum end-bells in two-cavity dies.

For the Paragould installation, the new Model 400-N's were built as "right-hand" and "left-hand" machines; are located shot end-to-shot end. One operator controls both machines, ladling from a central furnace.

The nation's leading producers of die castings rely on *Clevelands* for dependable, profitable performance. Investigate their advantages for your production. Built in 50, 200, 400 and 600 ton capacities, for zinc and aluminum casting. For machine specifications, write for new Bulletin No. 5246.



### **THE CLEVELAND AUTOMATIC MACHINE COMPANY**

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Cincinnati 12, Ohio**

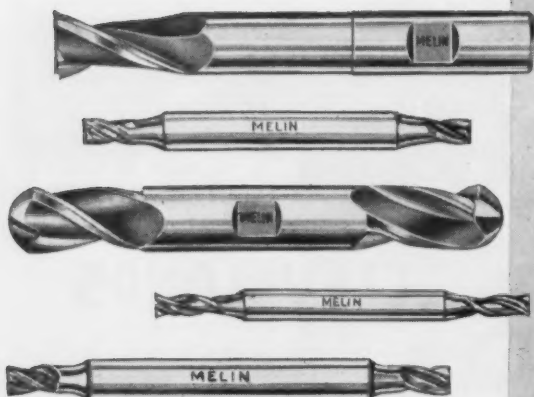
**SALES OFFICES: CHICAGO  
CLEVELAND • DETROIT  
HARTFORD • S. ORANGE**

**Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines**

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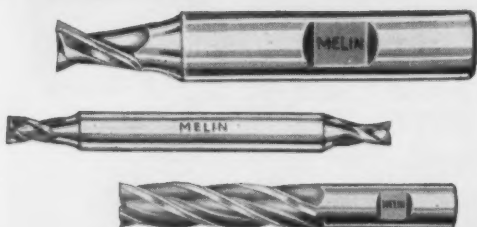
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# MELIN

## END MILLS



*Representatives in principal cities.*



**MELIN TOOL  
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accident  
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is in **CONSISTENT  
QUALITY**. This  
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performance . . .  
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Next time you order  
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specify the finest . . .  
specify **MELIN**.

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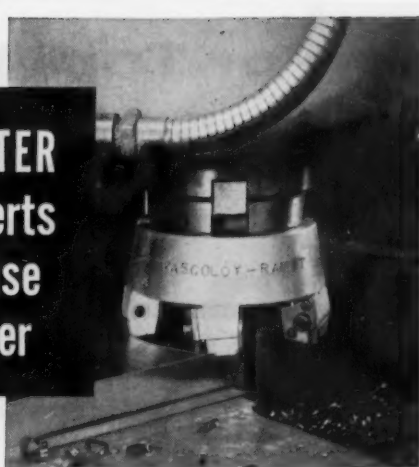
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November, 1957

# For Top Metal Cutting

# V-R FACE MILL CUTTER with throw-away inserts costs 72% less to use than brazed tip cutter



## No Carbide Grinding . . . Less Downtime . . . The Cutter Stays in the Machine

V-R cutters with throw-away carbide inserts will cut your face milling costs and increase production. Here is an example, machining 321 stainless:

A 6" V-R cutter removed 677.76 cu. in. of material—total tool cost \$26.91 for 20 insert cutting edges.

A brazed tip cutter removed 200 cu. in. before regrinding. Downtime cost \$10.00. Tool cost \$87.15. Total \$97.15.

### SAVING WITH V-R CUTTER — \$70.24 or 72%!

V-R cutters with throw-away inserts *completely eliminate carbide grinding*. There is almost no downtime—the cutter stays in the machine. When cutting edges are worn, simply index inserts to a new edge. When all eight edges are dull, replace with a new insert—it takes only a minute or two.

4", 6", 8" and 10" right hand negative rake and 6" right hand neutral rake styles standard. Left hand and larger diameters available.

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## Vascoloy-Ramet Corporation

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

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November, 1957

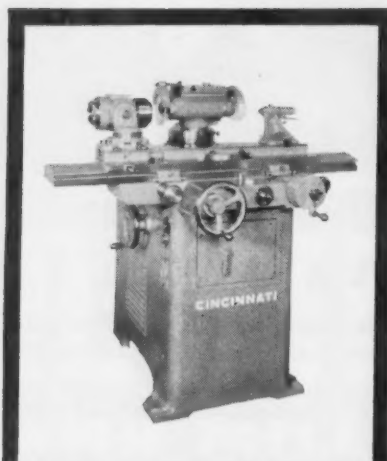
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## Efficiency



# For Top Metal Cutting

**Cincinnati gives you a choice  
of 5 Cutter and Tool Grinders**



Whatever is good for the cutting edge of your expendable tools is good for production. And CINCINNATI® Cutter and Tool Grinders are certainly good for the cutting edges of all types of milling and die sinking cutters, reamers, hobs, taps and others. There are 5 machines in the Cincinnati group. They constitute an exceptionally strong secondary line of production equipment for machine tools of all types. Sweet's Machine Tool File contains brief specifications. For complete data write for catalogs.

**THE CINCINNATI MILLING MACHINE CO.  
CINCINNATI 9, OHIO**

**NO. 2**  
Cutter and Tool Grinder  
Catalog No. M-2004



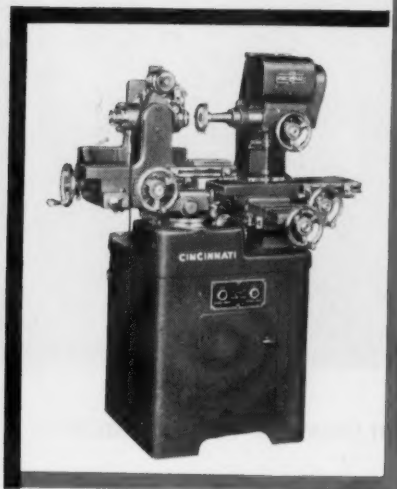
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Cutter and Tool Grinder  
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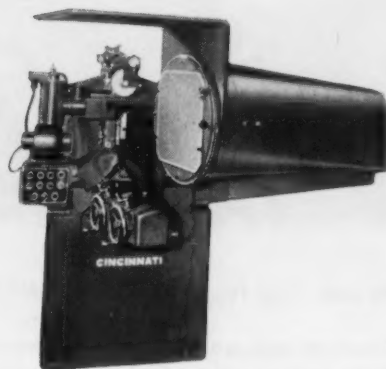
**new microbore  
"PRE-SET" TOOLS...**

# Efficiency

**CONTOUR**  
Cutter and Tool Grinder  
Catalog No. M-1918-1



**MONOSET**  
Cutter and Tool Grinder  
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**PROJECTO-FORM**  
Grinding Machine  
Catalog No. M-1612-5

# CINCINNATI

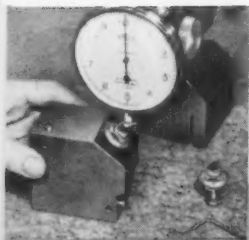
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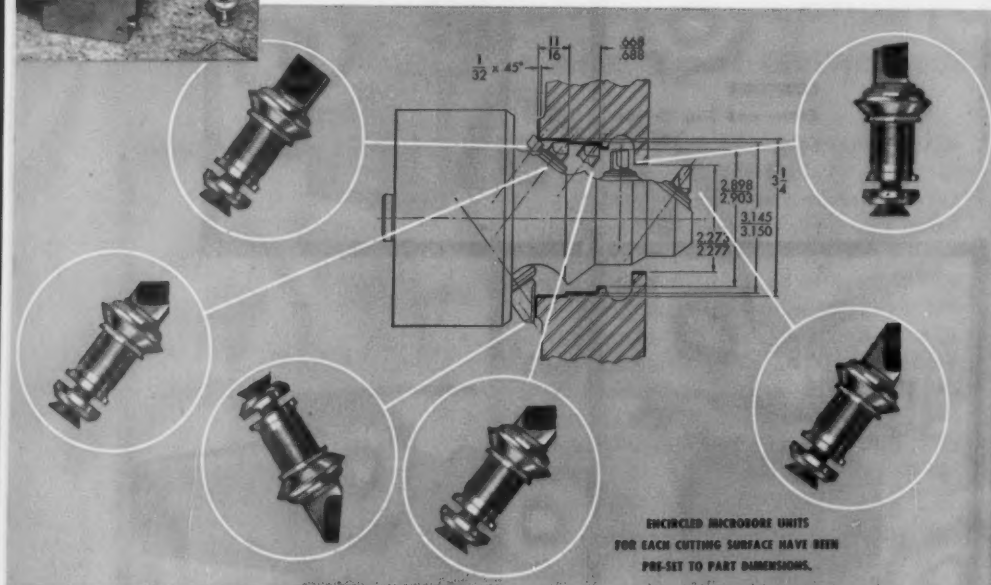
November, 1957

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drastically reduce downtime



## new microbore "PRE-SET" TOOLS...



**NO TRIAL CUTS! PRE-SET OUTSIDE THE MACHINE TO PART DIMENSIONS! CHANGED IN SECONDS!**

Microbore tools can now be pre-set to accurate part dimensions and quickly positioned in the machine without further adjustment. "Pre-Set" Microbore units greatly reduce machine downtime for worn tool point adjustment and eliminate scrap parts due to trial and error set-up. Changing of "Pre-Set" units is so fast and easy that operators are encouraged to keep sharp tools in their machines, guaranteeing greater accuracies and avoiding breakage due to dull tools.

DEVLIEG MICROBORE • DIVISION OF DEVLIEG MACHINE COMPANY

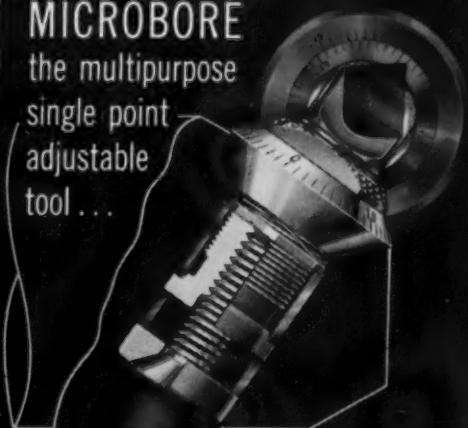
***The power reserve and range of speeds***



# drastically reduce downtime



**MICROBORE**  
the multipurpose  
single point  
adjustable  
tool ...



Microbore the original single point, adjustable tool with proven micrometer vernier adjustment. Pre-setting Microbore units to accurate part dimensions is the latest step forward in high-speed, precision production tooling.

"Pre-Set" Microbore units may be applied to standard boring, turning and facing operations. They are especially suited for production and automated operations where machines must maintain closest tolerances on long runs.

#### USE "PRE-SET" ON

Automated Boring Machines  
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Horizontal Boring Machines  
Vertical Boring Machines

• Write today for complete information on this new process!

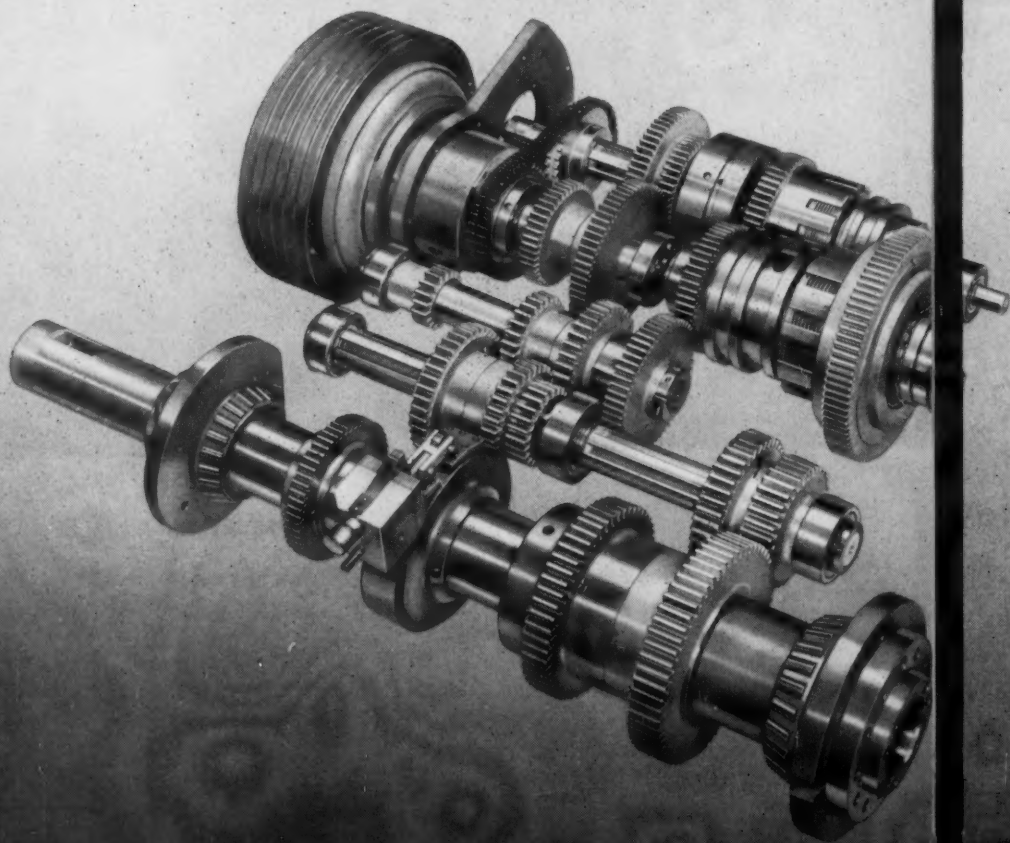
## DeVlieg MICROBORE SYSTEM

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*The power reserve and range of speeds*

**YOU'LL NEED FOR THE**



# TOOLS OF TOMORROW

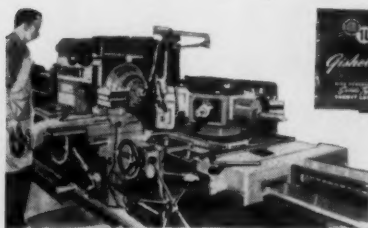
## New GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

**WANT MAXIMUM OUTPUT AND ACCURACY** from today's carbide tools—with an ample reserve of power and speeds to meet tomorrow's tooling requirements?

That's what you'll get—*now*—from this powerful, rugged Gisholt MASTERLINE Saddle Type Turret Lathe. Prime example of this machine's advanced features is the rugged Headstock Gear Train, shown at the left. Here, you can get 24 different forward speeds—all from a *single*-speed motor. This means you get *full* power *all* the time—a critically important feature for those heavy cuts at punishing feeds.

But that's not all. To give you maximum performance from this powerful gear train, Gisholt designers have backed it with faster speed changes through the Hydraulic Speed Selector (effortless speed shifts without waiting or computing); a hydraulically operated Hi-Lo speed change in a 6:1 ratio (without stopping the spindle or shifting gears); and a new Self-Adjusting Electric Clutch and Brake (smooth, fast starting and stopping, plus more accurate inching of the spindle).

Ask your Gisholt Representative to give you the complete facts. Why not call him today?



ASK FOR complete  
set of Gisholt  
MASTERLINE  
Saddle Type Turret  
Lathe Bulletins.

# GISHOLT

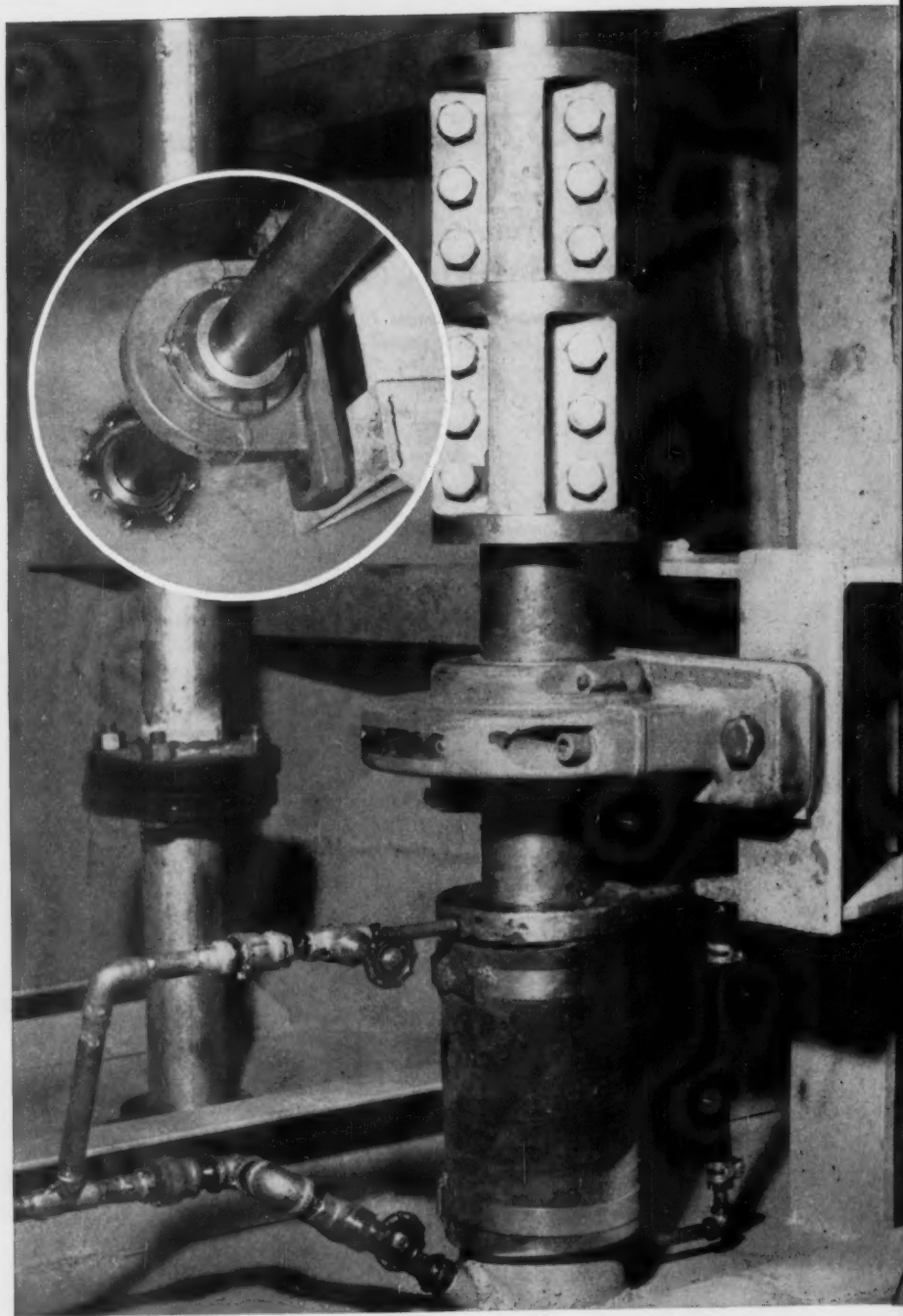
MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS  
BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

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# **Bearings, Inc.**

## **helps engineers design more efficient drive shaft installation and removal!**

Take this ship, now in ferry service on the North Carolina Coast, as an example. Six pillow blocks were required to support two drive shafts. Since these shafts pass through bulkheads and are surrounded by other equipment, conventional pillow blocks are extremely difficult to install or replace. Engineers from our Dixie Bearings, Inc. Division recommended the *split right down to the shaft* pillow blocks shown above.

This bearing has found wide acceptance where it is impractical or impossible to mount a solid ball or roller pillow block without tearing down the whole machine. Not only did the original installation cost less, but maintenance costs will be greatly reduced.

This is just another instance of the many services Bearings, Inc. offers its customers. No matter what type of equipment

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you operate... if bearings are an important part of that equipment—we are ready and able to help you with any bearing problem you may have.

*Providing bearing service in the territories adjacent to our branches, listed below.*

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**WEST VIRGINIA:** Charleston • Huntington • Parkersburg • Wheeling  
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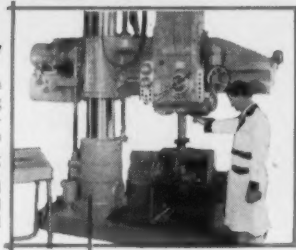
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It's true when Chef Victor of Cincinnati's famed Hotel Sheraton-Gibson carves a bird; it's true when Carlton makes a radial drill. Because Carlton makes nothing else, Carlton can make radial drills better. Fact is, having concentrated exclusively on radial drill research, engineering and manufacturing since 1916, Carlton can offer a wider range of the most up-to-date radial drills ever developed. Name your need — arm lengths from 3-ft. to 12-ft.; column diameters from 9" to 26" — Carlton makes 'em better. Take your choice of Carlton speed-feed controls — programming, pre-select, partial pre-select or manual — and special bases, tables and jigs for additional productivity. The Carlton Machine Tool Co., Cincinnati 25, Ohio.



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**SPECIALISTS IN RADIAL DRILLS**

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**No other machine of comparable size can equal it for  
ACCURACY — CAPACITY — SPEED — CONVENIENCE**

**KNIGHT'S *New*  
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No. 60 for  
PRECISION  
BORING & MILLING**

**TWO TABLE SIZES**

18" x 52"—28" longitudinal travel

18" x 60"—36" longitudinal travel

**UNUSUAL CAPACITY**—18" table cross feed, 30" vertical travel, deeper throat

**RUGGED BED-TYPE TABLE**—3-way bearing; bed 36" wide, saddle 46" long

**MORE VERSATILITY**—No more work transfers for milling, drilling, boring. Eliminates extra setups

**GREATER ACCURACY**—Handscraped bearings; spindle double mounted in roller and ball bearings. Fixed bed with stronger supports, less overhang

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**CHOICE OF 3 MEASURING DEVICES**—Hardened and ground precision screws, locating counters, dial indicator equipment

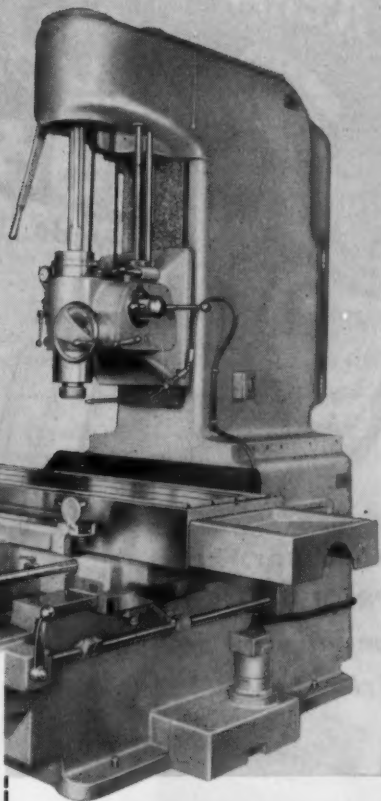


**W. B. KNIGHT MACHINERY CO.**

3922 West Pine Blvd. • St. Louis 8, Mo.

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November, 1957



**ATTACH  
TO COMPANY  
LETTERHEAD**

W. B. KNIGHT MACHINERY CO.  
3922 West Pine Blvd., St. Louis 8, Mo.

Send complete information on new No. 60 Vertical.

Name.....

Title.....

☐ Have representative call.

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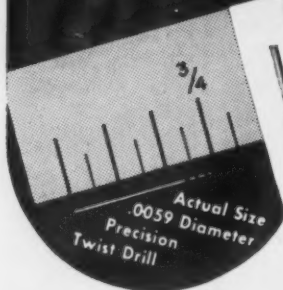
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*Precision*

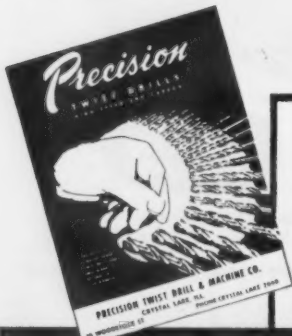
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**TWIST DRILLS**

Made from .0059 Diameter and Up



and cut  
down your  
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Write for **FREE**  
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and Money Saving  
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**PROVE IT TO YOURSELF with Precision's  
NO-RISK UNCONDITIONAL GUARANTEE**

Order a dozen or more Precision drills in the size or sizes you use. Put them to a test in your plant under your own conditions. If you find that Precision drills are not what we claim them to be in performance, accuracy and economy... return the unused drills and we will cancel your **ENTIRE BILL**... without quibble or question!

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10 Woodstock St.—Crystal Lake, Ill.—Phone: Crystal Lake 2040

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# POPE PRESENTS TWO NEW TIME-AND-MONEY SAVERS FOR YOU WHO DO THE GRINDING

## SAVES TIME >

POPE Self-Removing Wheel Holders with the POPE Man-Size Double End Speed Wrench enable you to take the wheel and wheel holder from the shaft, complete, in one piece, in less than 30 seconds by the clock!



## SAVES MONEY >

Wheel breakage is definitely eliminated. Shaft, bearings, and other spindle parts no longer take a beating.



## SAVES TIME >

POPE Interchangeable Extension Arbors have the rigidity to support the wheel for fast metal removal. Time for preliminary wheel dressing is reduced, too.

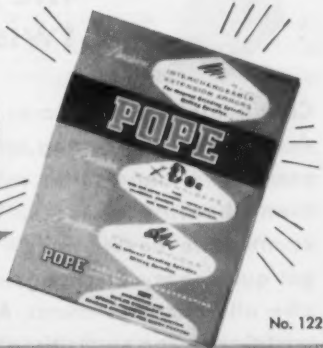


## SAVES MONEY >

More wheel is left for removing metal and for producing fine surface finishes and more of them per wheel.

### WRITE FOR NEW BULLETIN WA-10

It gives you complete information and specifications so that you can quickly select the right Wheel Holders, Extension Arbors and Collet Chucks for *your* machines and *your* spindles.



No. 122

# POPE®

**ENGINEERS AND BUILDS STANDARD AND SPECIAL  
PRECISION ANTI-FRICTION BEARING SPINDLES  
FOR EVERY PURPOSE**

**POPE MACHINERY CORPORATION • 261 RIVER STREET • HAVERHILL, MASS.**

*Established 1920*

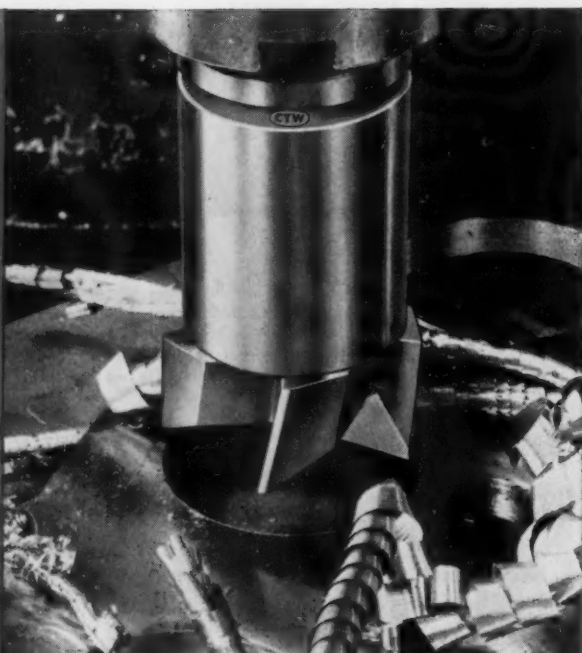
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CTW



Continental Counterbores may be purchased individually or in sets. Selection of three sets available.



## After the heaviest cuts— they disengage with a twist of the wrist

Continental Counterbores are designed so that cutting torque produces compression rather than shearing stresses. This counterbore never binds—you get quick, easy disengagement after all cutting operations. Anti-wedging action saves time and tools.

For more information or litera-

ture on Continental Counterbores, call your local Ex-Cell-O Representative or write to Continental Tool Works in Detroit.

Continental **TOOL  
WORKS**

DIVISION OF  
EX-CELL-O CORPORATION  
DETROIT 32, MICHIGAN

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November, 1957

# Announcing

## THE ALL-NEW LINE OF "BUFFALO" NO. 15 DRILLING MACHINES

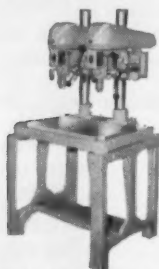
### *Totally-New Drilling Head Features These Major Improvements:*

- Front-Mounted "Start-Stop" Push Button Switch
- Easy-to-Read Speed Range Table
- Depth Gauge Graduated for Easy Setting
- Conveniently-Placed 3-Grip Spindle Feed
- Belt Guard Quickly Tilts Upward to Simplify Speed Changes
- Hinged Motor Bracket Permits Step-to-Step Belt-Changing on the Pulleys Without Tools
- Proper Belt Tension Is Automatically Maintained
- No Tools Needed for Head or Table Adjustments



"Buffalo" No. 15  
Heavy-Duty Bench Drill

Newly-designed "Buffalo" No. 15 bench and floor bases eliminate grease- and dirt-catching troughs and pockets around working area. Extremely sensitive for small hole drilling, these new machines are sufficiently rigid and heavy to operate at full capacity without strain or wear.



No. 15 Multiple  
Spindle Bench Drill

For a demonstration of the versatile new No. 15 Drill, contact your nearby "Buffalo" machine tool dealer. Or, for complete details, write us for Bulletin 4024.

The new "Buffalo" No. 15 line includes bench, floor and pedestal models (bench and pedestal types in 1- to 6-spindle models). Attachments are available for tapping, mortising, routing or spot-facing.



### **BUFFALO FORGE COMPANY**

388 Broadway Buffalo, N. Y.

*Canadian Blower & Forge Co., Ltd., Kitchener, Ont.*

**DRILLING • PUNCHING • SHEARING • BENDING**

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November, 1957

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**The BARDONS & OLIVER**

**No. 2 GEARED  
ELECTRIC**

# In One Year!...

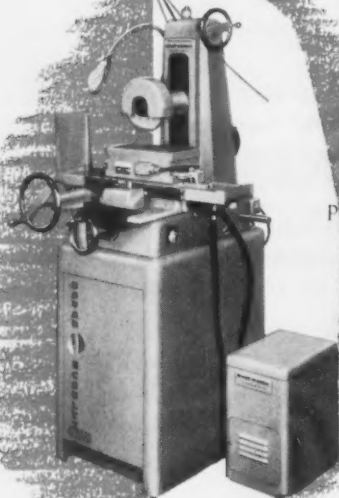
**"Our Boyar-Schultz 6 x 12 Surface Grinder  
Paid For Itself and Saved Us  
\$4197.30" \***

The above statement, part of a testimonial from Mr. Norman J. Bottie, General Manager of the Industrial Mica Corporation, Englewood, New Jersey, indicates the regard our customers have for the Boyar-Schultz 6 x 12 Surface Grinder.

This grinder has been in constant service sharpening mica stamping dies, which require the best in high precision equipment.

Mr. Bottie also states, "I might say that besides the savings we have received, we have had one full year with no breakdowns what-so-ever, not even a minor repair."

If you have a precision grinding problem, write for our FREE Catalog, describing the Boyar-Schultz 6 x 12 Surface Grinder.



**6x12**

**SURFACE  
GRINDER**

Hydraulic or Hand Feed  
Available

- SURFACE GRINDERS
- HIGH SPEED GRINDING ATTACH.
- PROFILE GRINDERS
- LEAD SCREW TAPPING ATTACH.
- HYDRAULIC BAR FEED
- SCREW MACHINE TOOLS
- TURRET LATHE TOOLS

**BOYAR-SCHULTZ CORPORATION**

2020 So. 25th Ave., Dept. MC, Broadview, Ill.

**\* ATTESTED FIGURES  
AVAILABLE  
ON REQUEST**

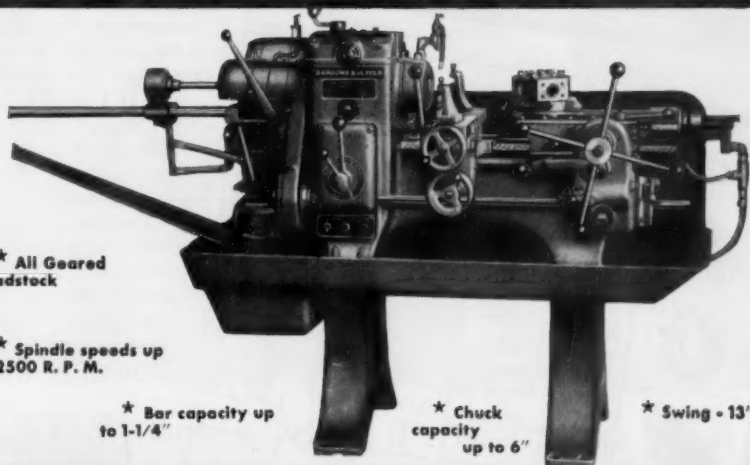
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**The BARDONS & OLIVER**

**No. 2 GEARED  
ELECTRIC**

## **Turret Lathe Handles *BOTH* BAR and CHUCK WORK**



★ All Geared  
Headstock

★ Spindle speeds up  
to 2500 R. P. M.

★ Bar capacity up  
to 1-1/4"

★ Chuck  
capacity  
up to 6"

★ Swing - 13"

**Why buy two Machines... When ONE will  
do the Job?.. Check these *Outstanding Features***



Write For New Catalog  
On Your  
Company Letterhead

- ◆ Only tenths of a second for spindle reversing and two to one speed changing.
- ◆ Permissible spindle reversals up to 10 cycles per minute.
- ◆ Twelve unduplicated quick speed changes in several optional ranges.
- ◆ Instantaneous Dynamic spindle brake.
- ◆ Headstock redesigned to deliver 25% more power.
- ◆ Automatic spindle reverse and speed change actuated by the operating cycle of the hexagon turret (optional extra).
- ◆ Redesigned heavy duty turret slide and saddle for greater accuracy, longer life, and quicker indexing.

*Manufacturers of a complete line of Turret Lathes and Cutting-off Lathes*

# **BARDONS & OLIVER, INC.**

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• CLEVELAND 13, OHIO









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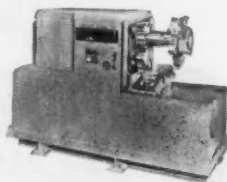
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# WARNER & SWASEY 2 AC AUTOMATICS

## pay for themselves with one year's savings at Thew Shovel Company

PRODUCTION RECORD					
PART	PART NAME	OLD TIME	NEW TIME	MONTHLY TURNOVER	% SAVINGS
	Pinion	.280 hours	.087 hours	100	69.0%
	Roller	.392 hours	.087 hours	2000	77.8%
	Sprocket	.376 hours	.177 hours	175	52.4%
	Roller	.373 hours	.126 hours	447	66.2%
	Roller	.372 hours	.141 hours	109	62.2%
	Spacer	.074 hours	.039 hours	770	47.2%
	Box	.431 hours	.193 hours	108	55.6%
	Box	.504 hours	.231 hours	36	54.0%

Cost savings from 47% to 77%! That's the production record of two Warner & Swasey 2AC Automatics on small and medium lot work at Thew Shovel Co., Lorain, Ohio. Annual dollar savings exceed the cost of both machines plus tooling! On small and medium lot work these automatics can undoubtedly return substantial savings for you. To discuss their application to your work, call in our Field Engineer.



**1 AC CHUCKING MACHINE**  
8" or 10" Chuck—6" Working Stroke

**2 AC CHUCKING MACHINE**  
10" or 12" Chuck—9" Working Stroke

**3 AC CHUCKING MACHINE**  
15" Chuck—11" Working Stroke

**WARNER  
&  
SWASEY**  
Cleveland  
PRECISION  
MACHINERY  
SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

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## And here's what it means to you!

Recent tests in drilling 16,300 holes show that there is a difference in bushings. In these tests Ex-Cell-O Bushings lasted twice as long as competitive makes.

These differences make Ex-Cell-O a leader: (1) High chrome, high carbon oil-hardening bearing steel, (2) uniform heat treating to 62-64 Rockwell "C". (3) Precision grinding of inside and outside diameters and under the head for perfect seating. (4) Ex-Cell-O's own standards for precision, tougher than A.S.A. standards.

Large inventories in Detroit, New York, Downey, Cal., Lima, Ohio, and London, Canada, keep your inventory down. You get immediate shipment. Write for an Ex-Cell-O Drill Jig Bushing Catalog today.



**EX-CELL-O**  
CORPORATION  
DETROIT 32, MICHIGAN

EX-CELL-O  
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PRECISION



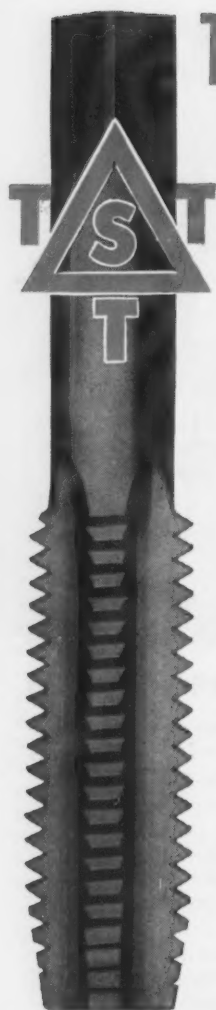
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MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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# TRIPLE TEMPERED TAPS

A STANDARD WITH

# SOSSNER

DELIVERS

*full value*

All SOSSNER taps are tempered THREE TIMES. The result...a tougher, more reliable, longer lasting tap, less chipping, less breakage.

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Permanent  
Super-Lubricant



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The most complete line

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Three Flute  
Double Scoop



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FACTORY WAREHOUSES IN NEW YORK AND LOS ANGELES • DEALER STOCKS IN OTHER CITIES

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# Holes, Contours, Surfaces

Published in the interests of greater accuracy and quality in the toolroom and on the production line by the Moore Special Tool Co., Inc., 730 Union Ave., Bridgeport 7, Conn., builders of Jig Bore, Jig Grinders, Panto-Crush Wheel Dressers, Precision Rotary Tables, Motorized Centers and a complete line of Hole Location Accessories.

## 7 Tricks of the Trade in Jig Grinding Small Holes

The following tricks of the trade will prove helpful in jig grinding small holes with a diamond-charged mandrel:

1. Uniformly graded diamond powder should be used for charging mandrels. Holes from minimum (1/64") to about 3/32" in diameter should be roughed and finished with 80-100 grit powder. Larger holes may be roughed somewhat more rapidly with a coarser grade, 60-80 grit.

2. Avoid bellmouth by preventing the mandrel from leaving the hole at either end.

3. Since a freshly charged mandrel will cut much more rapidly than a worn one, avoid introducing a freshly charged tool as a hole nears size, Fig. 1.

4. Do not permit the uncharged *shank* of a mandrel to contact the surface being ground. Frictional heat will burn both the work and the mandrel. The former, partially annealed at point of such contact, will charge with diamond and probably be ruined.

5. It is generally more economical and efficient to consider mandrels as expendable and make a new one for each job. Since the cost is only a few cents, use of an old one, or even the time spent trying to match one to requirements, is hardly justified.

6. Because mandrels cannot be trued with a diamond, it is necessary to measure both the top and bottom of a hole

while grinding, in order to avoid a ridge.

7. In view of point 6, it is advisable to set the work up on parallels of sufficient height to enable measurement from beneath the workpiece, Fig. 2.

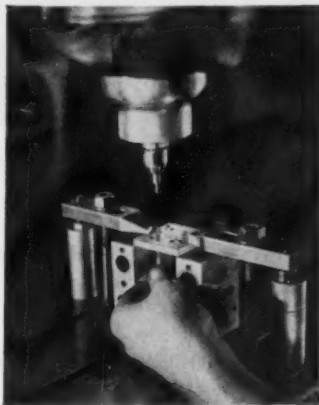


Fig. 2. Workpiece is mounted high enough to permit measuring bottom as well as top of hole.

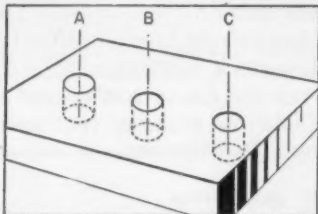


Fig. 1. In grinding three holes to size, A and B are roughed to within .001"-.002", and C within about .005". Using a freshly charged mandrel, C is finished to size, thereby breaking down the high points on the tool. A and B may now be safely ground to size.

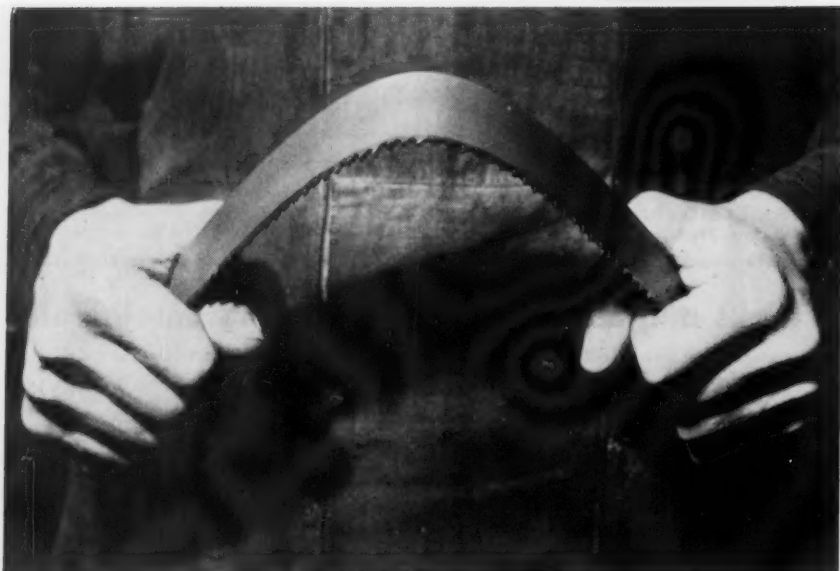
### Get ALL the answers from this new, 424-page book

The information on this page is just a sample of the valuable, on-the-job aid you can get from Moore's all-new book, **HOLES, CONTOURS AND SURFACES**. Tells you how to produce tools, dies and precision parts the modern way.



424 pages, 495 illustrations, 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Price only \$5 in U.S.A., \$6 elsewhere. Send check or money order to Moore Special Tool Co., Inc., 730 Union Ave., Bridgeport 7, Conn.

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## **THIS is No Ordinary Power Hack Saw Blade**

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge.

With a MARVEL Blade, you can cut any material—from the free machining steels to the toughest alloys . . . fast, accurately and economically.

You can tension a MARVEL Blade from 200% to 300% tauter than any ordinary blade, permitting much higher speeds and heavier feeds without deflection or breakage.

Like all good things, attempted copies of the MARVEL Blade have been numerous, but its performance has been *unequalled* by any of the imitators. Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

Write for latest cutting tool Bulletin and the name of your nearest MARVEL Distributor.

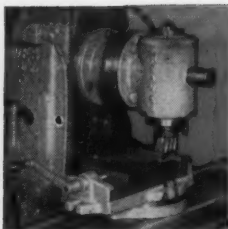
FB-1020



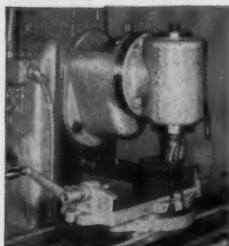
**ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.**

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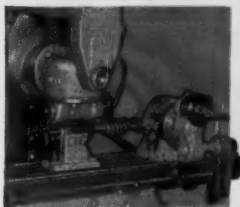




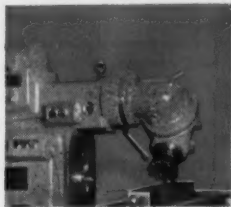
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Toolmakers Overarm

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attachments.

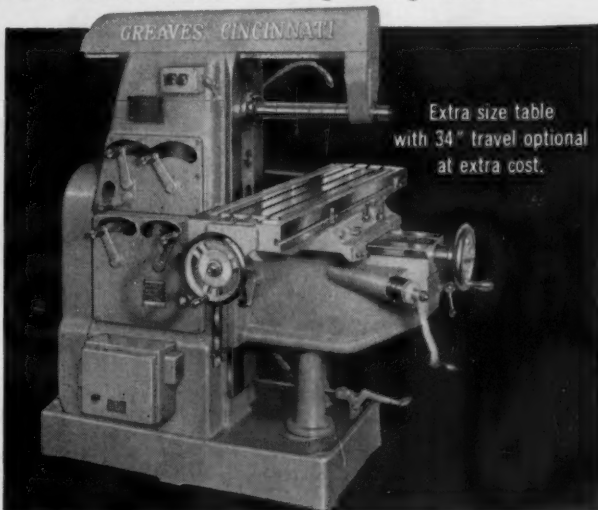
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increase versatility  
of dependable, low-cost**

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**"THE MOST MILL FOR THE LEAST MONEY"**

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS.

Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



Extra size table  
with 34" travel optional  
at extra cost.

## GREAVES MACHINE TOOL CO.

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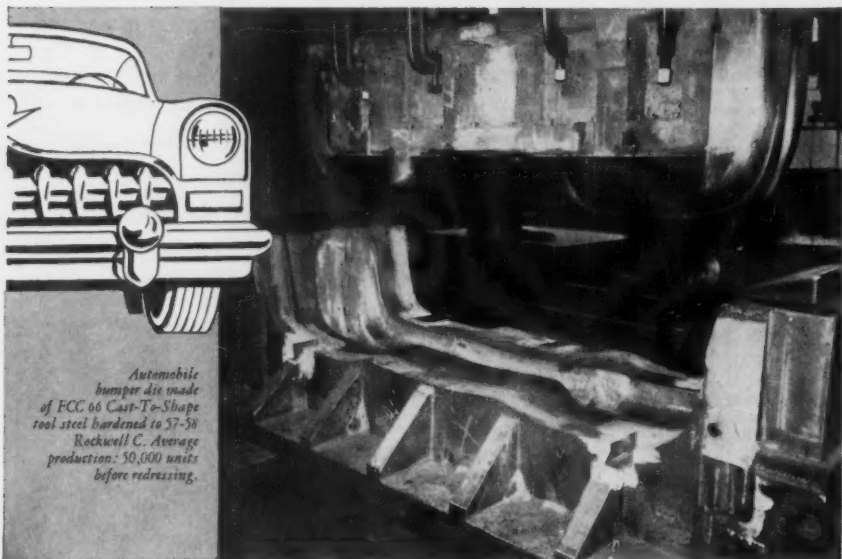
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Send information on Attachments and Accessories for GREAVES MILLS.

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Try this money-saving method  
that auto-makers use



*Automobile  
humper die made  
of FCC 66 Cast-To-Shape  
tool steel hardened to 57-58  
Rockwell C. Average  
production: 50,000 units  
before redressing.*

## A-L CAST-TO-SHAPE TOOL STEELS

Auto makers, too, are included in the long list of manufacturers enjoying the advantages and economies of A-L Cast-To-Shape tool steels. By this modern, money-saving method of tool and die making, it is possible to cast even intricate shapes to within an eighth of an inch of finished size. The savings in time and material over that of machining from solid stock are readily apparent.

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Remember, with A-L Cast-To-Shape tool steels, you buy less steel originally, and you have less machining to do for finish. Ask your A-L representative about them TODAY . . . or write Allegheny Ludlum Steel Corporation, Forging and Casting Division, Wanda and Jarvis Aves., Detroit 20, Mich.

**SEND FOR THIS  
NEW CATALOG  
"FORGING AND  
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Contains the latest information on FCC Air Hardening, Oil Hardening and other Cast-To-Shape Tool Steel Specialties that can save you time and money . . . also Composite Die Sections and Smooth Hammered Forgings in a wide range of tool and stainless steels. Don't wait—get your copy NOW.

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November 1957 issue

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Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

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29	59	89	119	149	179	209	239	269	299
30	60	90	120	150	180	210	240	270	300

### ADVERTISEMENTS

301	—Front Cover	435	465	495	525	555	585	615	645	675	705	735	765	795
302	—Inside Front Cover	436	466	496	526	556	586	616	646	676	706	736	766	796
303	—Inside Back Cover	437	467	497	527	557	587	617	647	677	707	737	767	797
304	—Back Cover	438	468	498	528	558	588	618	648	678	708	738	768	798
305	331 357 383	409	439	469	499	529	559	589	619	649	679	709	739	769
306	332 358 384	410	440	470	500	530	560	590	620	650	680	710	740	770
307	333 359 385	411	441	471	501	531	561	591	621	651	681	711	741	771
308	334 360 386	412	442	472	502	532	562	592	622	652	682	712	742	772
309	335 361 387	413	443	473	503	533	563	593	623	653	683	713	743	773
310	336 362 388	414	444	474	504	534	564	594	624	654	684	714	744	774
311	337 363 389	415	445	475	505	535	565	595	625	655	685	715	745	775
312	338 364 390	416	446	476	506	536	566	596	626	656	686	716	746	776
313	339 365 391	417	447	477	507	537	567	597	627	657	687	717	747	777
314	340 366 392	418	448	478	508	538	568	598	628	658	688	718	748	778
315	341 367 393	419	449	479	509	539	569	599	629	659	689	719	749	779
316	342 368 394	420	450	480	510	540	570	600	630	660	690	720	750	780
317	343 369 395	421	451	481	511	541	571	601	631	661	691	721	751	781
318	344 370 396	422	452	482	512	542	572	602	632	662	692	722	752	782
319	345 371 397	423	453	483	513	543	573	603	633	663	693	723	753	783
320	346 372 398	424	454	484	514	544	574	604	634	664	694	724	754	784
321	347 373 399	425	455	485	515	545	575	605	635	665	695	725	755	785
322	348 374 400	426	456	486	516	546	576	606	636	666	696	726	756	786
323	349 375 401	427	457	487	517	547	577	607	637	667	697	727	757	787
324	350 376 402	428	458	488	518	548	578	608	638	668	698	728	758	788
325	351 377 403	429	459	489	519	549	579	609	639	669	699	729	759	789
326	352 378 404	430	460	490	520	550	580	610	640	670	700	730	760	790
327	353 379 405	431	461	491	521	551	581	611	641	671	701	731	761	791
328	354 380 406	432	462	492	522	552	582	612	642	672	702	732	762	792
329	355 381 407	433	463	493	523	553	583	613	643	673	703	733	763	793
330	356 382 408	434	464	494	524	554	584	614	644	674	704	734	764	794

modern  
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**BUSINESS REPLY CARD**

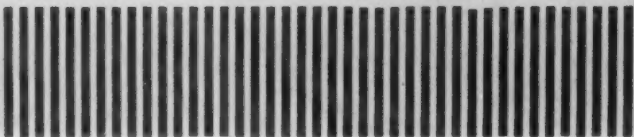
*No Postage Stamp Necessary If Mailed in the United States*

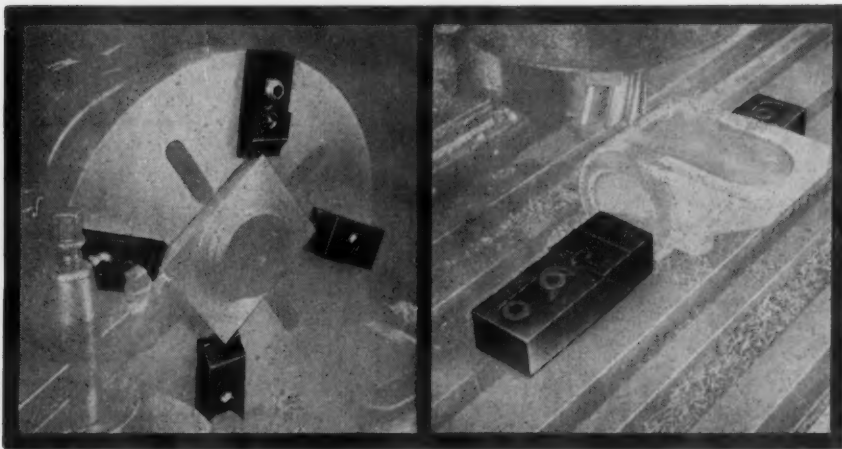
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**modern  
machine  
shop**

**431 MAIN ST.  
CINCINNATI 2, OHIO**

**FIRST CLASS  
PERMIT No. 1702  
CINCINNATI, OHIO**





J & S "ALL-PURPOSE" JAW CLAMPS CAN BE USED ON ALL STANDARD TYPES OF MILLING MACHINES, LATHES, PLANERS, BORING MILLERS, DRILL PRESSES, AND OTHER MACHINE TOOLS

## Eliminate "U" Clamps, Straps and Fingers, cut handling time 75%

J & S "All-Purpose" Jaw Clamps give you many unusual advantages in securing workpieces to machine tools—save as much as 75% of the time required with outdated methods.

### Downholding Principle

J & S' downholding principle makes this possible. Here's how it works: When you turn the adjusting screw of the clamp, the jaw travels straight in and down. This forces the workpiece horizontally against the opposite clamp and downward against the face plate or table. In this way, centering is quick, simple. The tapered slot prevents the clamp from slipping regardless of the load.

### Need no U-clamps or straps

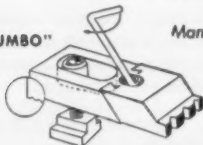
With J & S "All-Purpose" Jaw Clamps, you can avoid the use of U-clamps and straps, disregard different length studs and blocking. You can also minimize obstructions in set-ups, reduce cut-off waste. You can pass over J & S Jaw Clamps 1" from the working surface of the machine face. The whole surface of the workpiece can be machined to within  $\frac{1}{8}$ " of the face plate or table.

You can get J & S "All-Purpose" Jaw Clamps in a variety of sizes. Write for complete information today.

### J & S "JUMBO" and "LI'L GIANT" JAW CLAMPS

For large planers

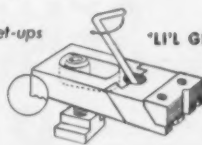
"JUMBO"



Many times more powerful than finger set-ups

COMPLETELY HARDENED

"LI'L GIANT"



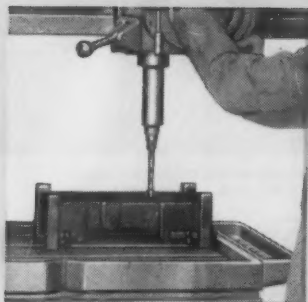
Both clamps have T-nuts which fit all large standard planers. 45° oblique travel of jaw secures workpiece against table and against counterthrust of opposite clamp.  $\frac{1}{8}$ " back taper (dotted line) and relieved ground surface (magnified detail) prevent slippage



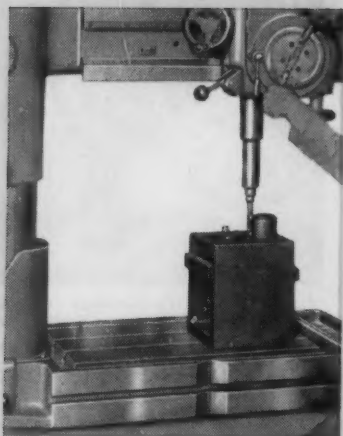
WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

871 DORSA AVENUE, LIVINGSTON, NEW JERSEY

For more data circle 334 on Reader Service Card



**SMALL WORK**



**BIGGER...**

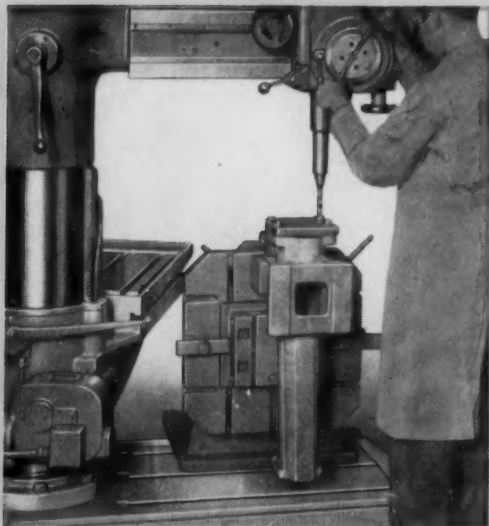
# FOSDICK SENSITIVE RADIAL DRILLS

*sensitive to your*

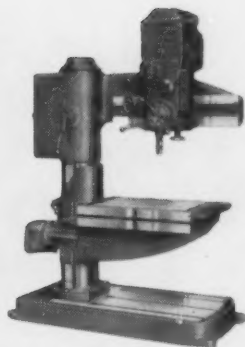
We put a table on the radial to give you two machines in one—and a work size versatility that is unmatched in any drilling machine of comparable price and size!

Actually, the Fosdick Sensitive Radial combines the best features of two proven, reliable designs. The capacity and flexibility of a radial—the rigidity, compactness and convenience of an upright. For job shop work or production, it's the answer to useful capacity in limited floor space. Economically priced, too! The economy of first cost is second only to the economy of use.





## STILL BIGGER



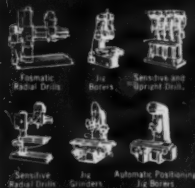
ALL THESE WORK SIZES ON ONE MACHINE—  
The Fostedick Sensitive Radial Drill. Also  
available as a Layout Machine, which  
combines high precision compound table  
with sensitive radial drill.

## *work size problem...and your pocketbook*

The arm of the Sensitive Radial swings 360° on the rigid one-piece column. Controls are always at the same convenient height. Work is placed on the adjustable table, or on the base with the table swung out of the way. Drills up to 2" in cast iron. 12" column, 3' or 4' arm, nine speeds (ranges from 60-1200 to 175-3500 rpm), four feeds (.004-.020 or .002-.010), 3 hp motor, reversing motor control for tapping.

Write today for complete information on the Fostedick Sensitive Radial Drill.

Ask for Bulletins SRA and LMA.



**NEED DRILLING EQUIPMENT?  
GET A PROPOSAL FROM FOSDICK!**

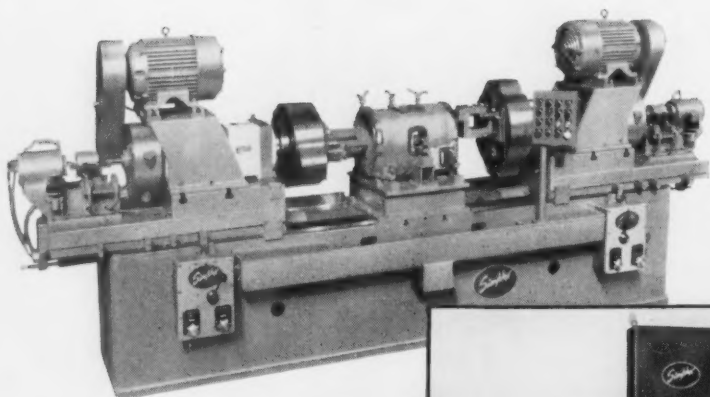
**FOSDICK**

THE FOSDICK MACHINE TOOL CO.  
CINCINNATI 23, OHIO

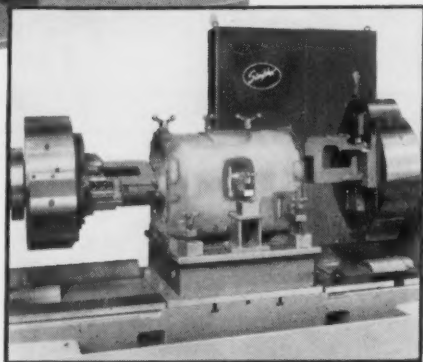
For more data circle 333 on Reader Service Card

# Simplex

## PRECISION BORING MACHINES



SIMPLEX 4U 2-WAY UNIT TYPE HYDRAULIC FEED PRECISION BORING MACHINE complete with two #5 SIMPLEX self-lubricated ball bearing precision boring heads mounting a gear reduction unit, hydraulic feed-out mechanism and a 20" O.D. feed-out facing head with 4" stroke. Fixture is manually clamped and designed to permit rear clamps to be operated from front.



## 25<sup>TH</sup> Anniversary

1932 — 1957

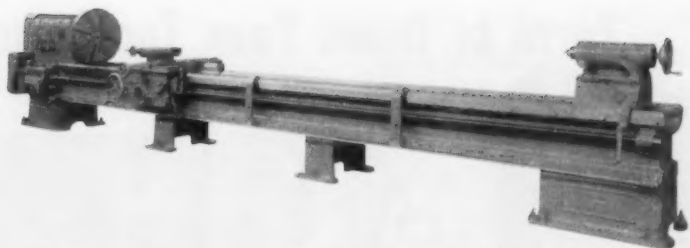
### SIMPLEX MACHINE TOOL CORPORATION

4528 WEST MITCHELL STREET  
MILWAUKEE, WISCONSIN

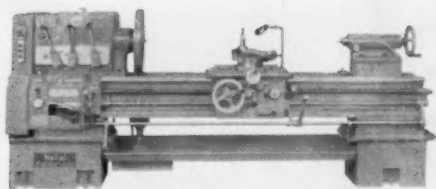
PRECISION BORING MACHINES • PLANER TYPE MILLING MACHINES  
SPECIAL DRILLING, TAPPING AND BORING MACHINES

For more data circle 337 on Reader Service Card

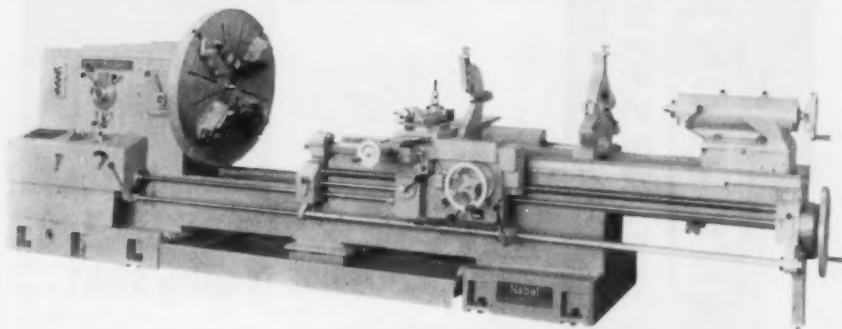
## Form or Dress Your Tool Wheels



**need a 40" lathe? what's the cost?**



**use a 20" lathe, too? what'll you pay?**



**buy this lathe and get the capacity of both  
at less than you pay for a 25" heavy duty!**

Do you turn a variety of chucking and between-centers work? Then the Nebel XB 20"/40" heavy duty extension bed gap is your best lathe investment. Because it has the capacity of two ordinary lathes. Yet occupies the floor space of but one machine . . . and calls for only one investment.

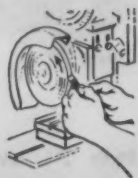
Other double-duty Nebel extension bed gap lathes: G 28"/50" heavy duty and AG 20"/40" medium duty. Nebel also manufactures removable block gap and standard lathes. Send for descriptive bulletins. Nebel Lathe Div., Nebel Machine Tool Corp., 3409-A Central Parkway, Cincinnati 25, Ohio.

For more data circle 338 on Reader Service Card



# Form or Dress Your Tool Wheels

*=in-a-jiffy=*



Clean up  
a wheel face

Form a radius  
or groove



Touch up a  
cup or saucer

## with a NORBIDE Dressing Stick\*

A NORBIDE Stick of boron carbide — the hardest material made by man — will outlast hundreds of ordinary abrasive sticks. You'll find it will greatly reduce dressing dust nuisance also. Order a supply of these cost-cutting sticks from your local Norton distributor or write for Form 1567 giving more details.

\*Actual size  $3\frac{1}{8}'' \times \frac{1}{2}'' \times 3''$

NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.

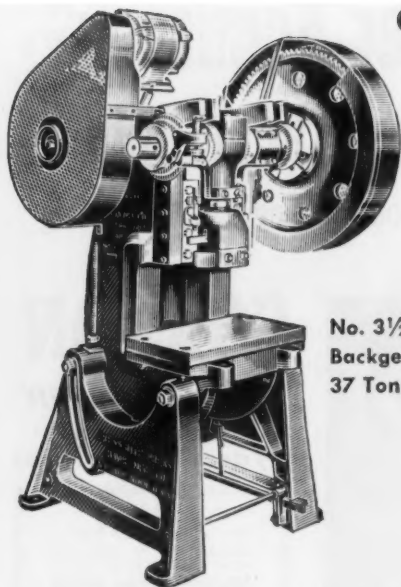


*Making better products...*

*to make your products better*

For more data circle 339 on Reader Service Card

# Now "Micrometer Accuracy"



**No. 3 1/2  
Backgeared Model  
37 Ton**

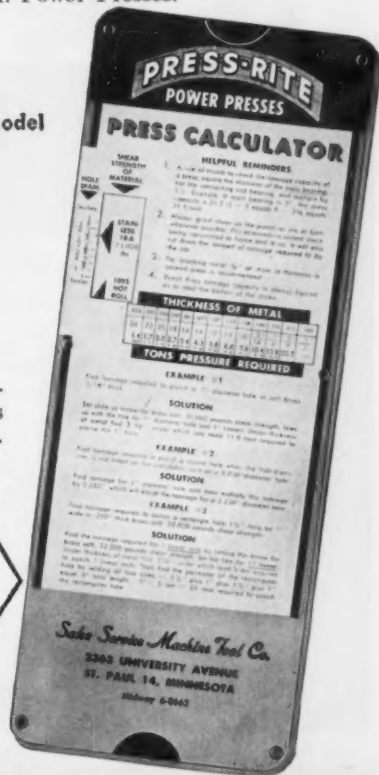
Perfect alignment of ram is easy to maintain through independently adjustable gibbs on extra long, heavy, full vee ramways. Also available in flywheel type.

**FREE** Slide tonnage calculator and working stroke pressure guide plus other valuable information. Value \$1.00, **FREE** if requested on company letterhead. Write **TODAY**.

For specifications on all PRESS-RITE models from 2 to 85 ton capacity write for Press-Rite catalogue No. 757.

## Get **EXTRA** Production from the **Built-in EXTRAS** in **PRESS-RITE PRESSES**

Uni-Cast high tensile semi-steel frames, double ramway lubrication, patented automatic brake and cam operated non-repeat mechanism are a few reasons you get extra production from PRESS-RITE O.B.I. Power Presses.



**PRESS-RITE DIVISION  
of Sales Service Machine  
Tool Company**

2355 University Avenue  
St. Paul W14, Minnesota

**PRESS-RITE**  
**O. B. I.**  
**POWER PRESSES**

For more data circle 340 on Reader Service Card

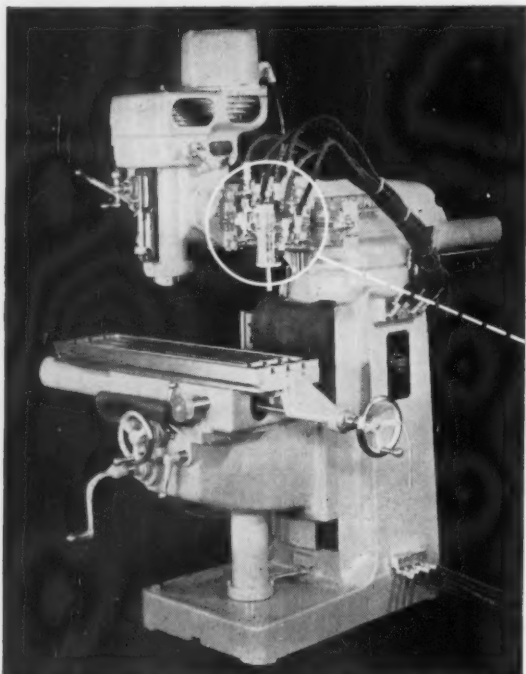
November, 1957

modern machine shop 39

**if you're using special fasteners...**

# Now "Micrometer Accuracy" Applied to Hydraulic Tracer Control

Provides more speed in Production Profiling and Duplicating



Gorton Trace-Master Hydraulic Tracer control is today's best unit for 2- and 3-dimensional duplication, production profiling and work on all types of die forging, die casting, metal stamping, embossing and coining, as well as plastic molds in both ferrous and non-ferrous materials.

## GORTON "TRACE MASTER" Supersensitive Hydraulic Control

This master control valve is manufactured to tolerances which are NEW in the field of hydraulics. Working parts are so delicately ground and lapped that they will operate only with a very fine grade of special oil. Ordinary hydraulic fluids are wholly unsuitable.

### 3 MODELS AVAILABLE

180° Vertical Hydraulic Feed to Knee.  
360° Cross Hydraulic Feed to Ram and Longitudinal Hydraulic Feed to Table.

3D Hydraulic feed to knee, ram and table for 3-dimensional work.

The above can be furnished with the Gorton 1-22 Mastermill illustrated here or the Gorton 9-J Super-Speed Vertical Mill with single spindle, twin spindles and/or six inch higher column for additional vertical capacity.

Write for complete information contained in bulletin 2771-1711.



**GEORGE GORTON MACHINE CO.**

1711 RACINE STREET

RACINE, WISCONSIN

SINCE 1893

Tracer-Controlled Pantographs, Duplicators — standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 341 on Reader Service Card

40 modern machine shop

November, 1957

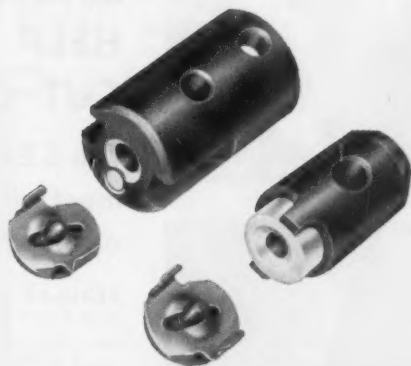
## HOW SUNOCO



if you're using special fasteners...

...you  
should  
be  
using

## APEX SOCKETS



Typical Apex sockets designed for use with special high-speed, resilient fasteners. Note recesses in outer walls to accommodate fastener prongs; integral magnets to help speed assembly. Openings near drive ends of sockets serve to dispel minute particles from rubber seals on fasteners.

Today's assembly techniques frequently require special types of fasteners. On one assembly line, speed may be the important factor . . . on another, a resilient fastener may be needed to protect brittle or highly-finished components . . . still another may require a self-locking or vibration-proof fastener.

Each application creates its own problem to be solved with a special fastener. And each special fastener can be run down—

quickly, smoothly, economically—with an Apex socket designed for the job.

Apex, where special nut running problems are solved every day, has the answer to your fastening problem, routine or special. In our Catalog 29-R, you'll find over 5,000 types and sizes of standard nut running tools and a frequently-repeated note that reads, "We quote promptly on specials." Write, on your company letterhead please, for your copy.

# APEX

THE APEX MACHINE & TOOL COMPANY

1027 S. Patterson Blvd. • Dayton 2, Ohio

ATLANTA • BALTIMORE • BATON ROUGE • BIRMINGHAM • BUFFALO • CHARLOTTE  
CHICAGO • CLEVELAND • COLUMBUS (Newark) • DALLAS • DAVENPORT • DENVER  
DETROIT • HOUSTON • INDIANAPOLIS • KANSAS CITY • LOS ANGELES • LOUISVILLE  
MEMPHIS • MILWAUKEE • MINNEAPOLIS • NEW ORLEANS • NEW YORK CITY • OAKLAND  
PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • ST. LOUIS • SEATTLE  
SHREVEPORT • SOUTH BEND • SYRACUSE • WICHITA

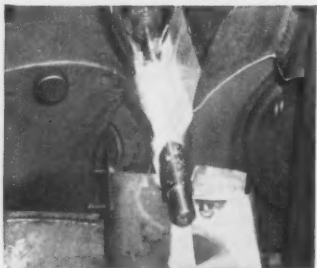
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November, 1957

modern machine shop 41



**CUTTING**



**GRINDING**



**ROLLING**



**WASHING**

## HOW SUNOCO EMULSIFYING OILS HELP YOU CUT COSTS

*The S.E.C.O. series will  
meet all your emulsifying  
oil needs*

**REGULAR** • Sunoco® Emulsifying Cutting Oil (S.E.C.O.) is a low-cost general-purpose oil for most cutting and grinding applications. Operators like S.E.C.O.—it makes clean emulsions that stand the gaff of long production runs. Its superior rustproofing ability protects both machines and work.

**HEAVY-DUTY** • S.E.C.O. HD emulsions have film strengths more than twice those of regular emulsifying oils. This extra strength, plus high oiliness, gives you a low-cost way to machine today's tough alloys and "hot" jobs.

**SPECIAL** • Custom grades of Sunoco Emulsifying Cutting Oil are made to meet unusual hard-water conditions. Other special formulations are used in rolling steel, brass, aluminum . . . in hot and cold washing . . . in rustproofing . . . and in many other applications.

**FOR FULL INFORMATION:** Call your Sun representative or write for Technical Bulletin 16 (S.E.C.O.) and Technical Bulletin 11 (S.E.C.O. HD). Write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-11.

**Industry uses more Sunoco Emulsifying Oil than any other emulsifying oil.**



**INDUSTRIAL PRODUCTS DEPARTMENT**  
**SUN OIL COMPANY** PHILA. 3, PA.  
In Canada: Sun Oil Company Limited, Toronto and Montreal

© SUN OIL CO., 1957

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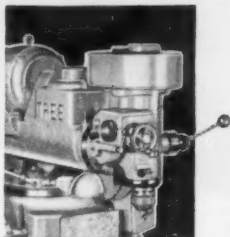
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# *the new tree 2VG mill*

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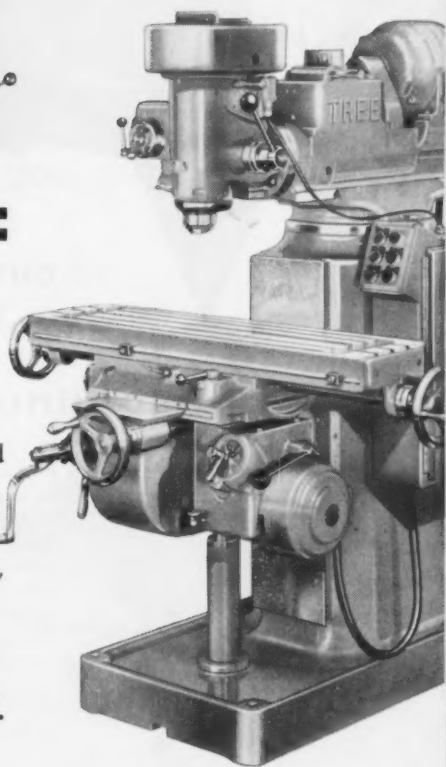
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## **12 Geared Speeds**

The TREE 2VG Vertical Mill provides unusual capacity and rigidity; 12 geared speeds ranging from 50 to 2500 RPM; a geared-in-ram mill having capacity to handle cutters up to 4" diameter and with 6" quill travel. Ram is dovetail type with integral gear box and 3 H.P. motor mounted.

*For full information write . . .*



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**TREE** TOOL AND DIE WORKS  
Racine, Wisconsin

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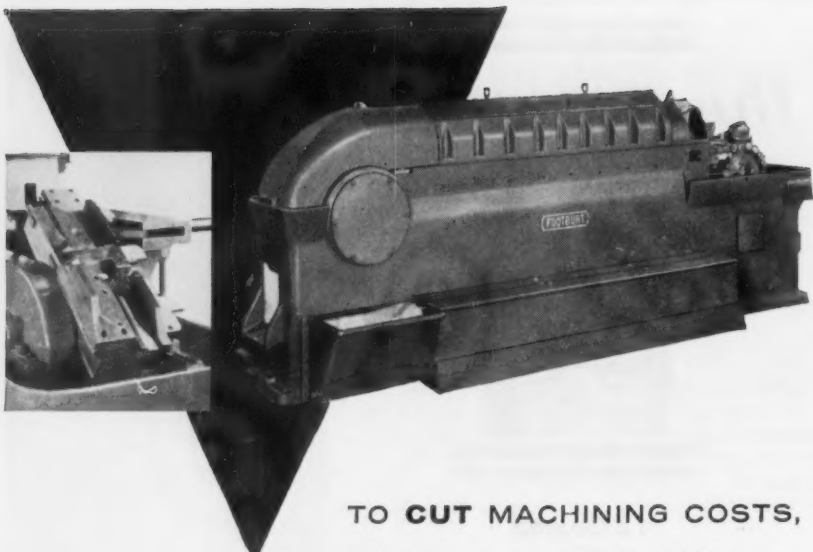
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November, 1957

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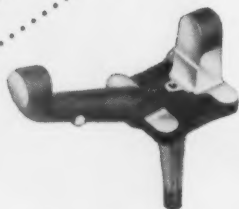
12 spindle speeds, instantly  
selected with direct-  
reading, color match dial.

All-geared spindle



TO **CUT** MACHINING COSTS,  
MACHINE **FASTER** WITH

# .....C Continuous broaching



Higher machining production than ever achieved by any other method has been made possible in many cases through the use of the Footburt Continuous Surface Broaching Machines. In most cases, production is limited only by the speed at which parts can be loaded into the self-clamping fixture. Unloading is automatic. If you have a problem of high production on small parts, send blueprints and hourly requirements.

**THE FOOTE-BURT COMPANY**  
Cleveland 8, Ohio

Detroit Office: 24632 Northwestern Hwy., Detroit 35, Mich.

**ENGINEERED FOR PRODUCTION**

Write for Circular No. 503

# FOOTBURT

**PIONEERS IN SURFACE BROACHING**

For more data circle 345 on Reader Service Card

12 spindle speeds, instantly selected with direct-reading, color match dial.

All-geared spindle drive transmission.

Totally enclosed quick change gear box. 48 or 54 thread-feed changes.

Ground and flame hardened bedways insure years of accurate service.

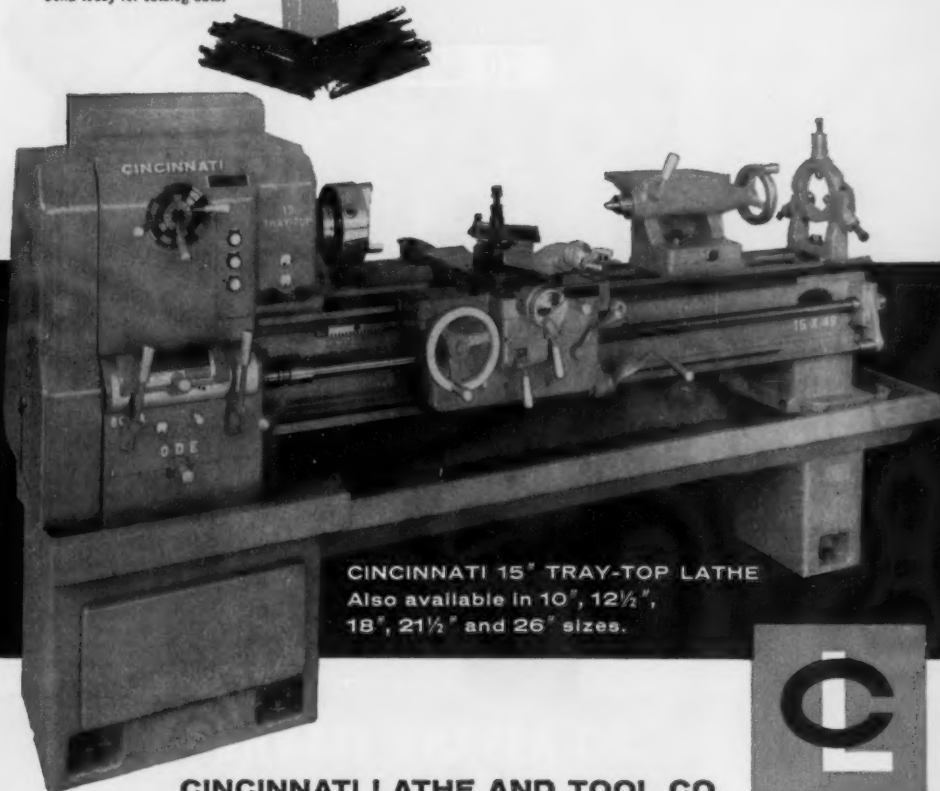
Hardened steel gears in all 3 transmissions assure long-life operation.

Fully enclosed electrical controls increase operating ease and safety.

Tray-Top Lathes give you many other features normally found only on larger, more expensive lathes. For all the facts and features, see your Cincinnati dealer. Send today for catalog data.

Because it's a  
**CINCINNATI  
TRAY-TOP LATHE**

more goes into it...  
you get more out of it!



**CINCINNATI 15" TRAY-TOP LATHE**

Also available in 10", 12½",  
18", 21½" and 26" sizes.

**CINCINNATI LATHE AND TOOL CO.**

3207 Disney Street, Cincinnati 9, Ohio  
Builders of Engine, Toolroom and Fixed Gap Bed Lathes and a Complete Line of Drilling Machines  
For more data circle 346 on Reader Service Card



**accurately shears thin sheet**

# CINCINNATI



1/2" PLATE



20 GAUGE

This machine is a good example. It's a 4310 Series Cincinnati, with a capacity of  $\frac{1}{2}$ " by 10' mild steel. The photos show it accurately shearing  $\frac{1}{2}$ " plate and 20 gauge sheets . . . with the same knife clearance.

## TOOL BITS

## Meetings

*Important Meeting*



# accurately shears thin sheet and heavy plate...

**without changing  
knife clearance!**

You don't have to change knife clearance each time you cut a different thickness on a Cincinnati Shear. With the knife clearance set for thin material, Cincinnati Shears will accurately cut all thicknesses up to capacity.

This statement is being demonstrated daily, by the thousands of Cincinnati Shears in operation. Carefully conducted engineering tests have proven the following facts:

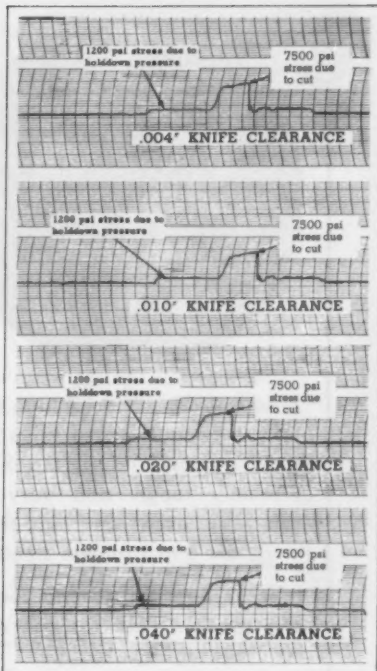
- Knives last just as long when cutting different thicknesses with one knife clearance, as when clearance is changed for each thickness.

- A Cincinnati Shear works no harder when cutting with a close clearance than it does with a large clearance.

- Shearing with one knife clearance is safe, since thin sheets cannot become accidentally wedged between the knives.

- Cincinnati Shears with single knife clearance are time-savers, since the unnecessary clearance-changing operation is eliminated.

The results of two of these tests are shown at the right. For complete information on Cincinnati All-Steel Shears, write Department G for Catalog S-7R.



These tests show stress in a Shear frame when cutting heavy material, using different knife clearances. They prove that cutting pressure is not affected by knife clearance.

## THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES



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# TOOL BITS

THAT SATISFY

*Sparground*

The Unusual Bits



Made from a special high grade alloy steel that makes them especially adaptable for machining extremely tough and very hard materials, such as heat-treated steels, die and stainless steels, etc.

These Spartan ground tool bits have greater wear resistance than any other high speed type.

**See Your Local Spartan  
Distributor Today**

***Spartan***  
**SAW WORKS**  
**SPRINGFIELD 7, MASS.**

For more data circle 349 on Reader Service Card

48 modern machine shop

## Meetings

### Important Meeting

#### Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**November 2-8** • American Society for Metals, Annual Meeting and Exposition, Palmer House and International Amphitheatre, Chicago. Society headquarters: 7301 Euclid Ave., Cleveland 3, Ohio.

**November 4-8** • Society for Non-destructive Testing, Fall Technical and Annual Meeting, Morrison Hotel, Chicago. Society headquarters: 1109 Hinman Ave., Evanston, Illinois.

**November 6-8** • Grinding Wheel Institute and Abrasive Grain Association, Annual Meeting, Sheraton-Blackstone Hotel, Chicago. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, Ohio.

**November 11-15** • National Electrical Manufacturers Association, Annual Meeting, Traymore Hotel, Atlantic City, N. J. Association headquarters: 155 E. 44th St., New York 17, New York.

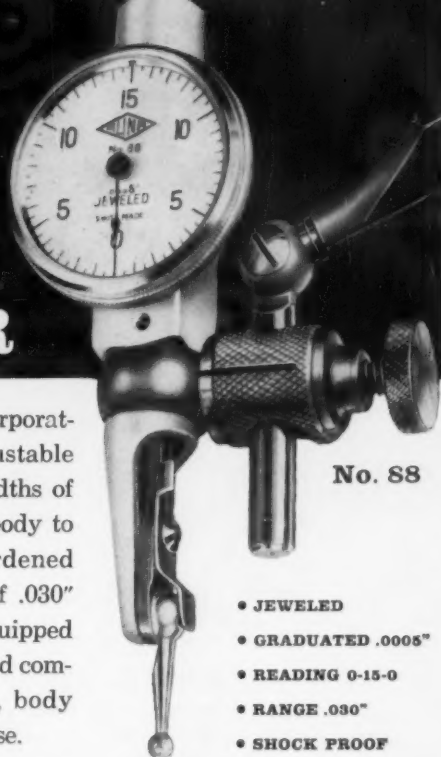
**December 1-6** • American Society of Mechanical Engineers, Annual Meeting, Hotel Statler, New York. Society headquarters: 29 W. 39th St., New York 18, New York.

**December 2-6** • Exposition of Chemical Industries, New York Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

November, 1957

# ALINA DIAL TEST INDICATOR

A fully reversible indicator incorporating a clear easy-to-read, adjustable dial, graduated in half thousandths of an inch, a switch lever on the body to reverse action and TWO hardened chrome plated contact points of .030" and .100" diameter that are equipped with a non-slip ratchet. Furnished complete with a universal shank, body clamp, and plush lined steel case.



No. 88

- JEWELLED
- GRADUATED .0005"
- READING 0-15-0
- RANGE .030"
- SHOCK PROOF



WRITE FOR LITERATURE AND COMPLETE CATALOG

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122 East Second St., Mineola, L. I., N. Y.

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Please send FREE literature on the entire line of ALINA precision measuring instruments.

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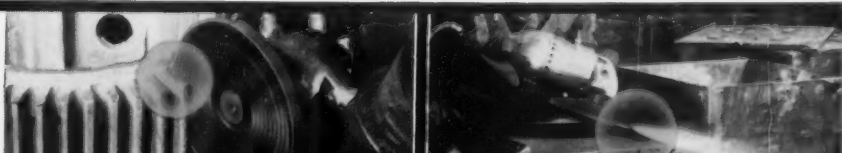
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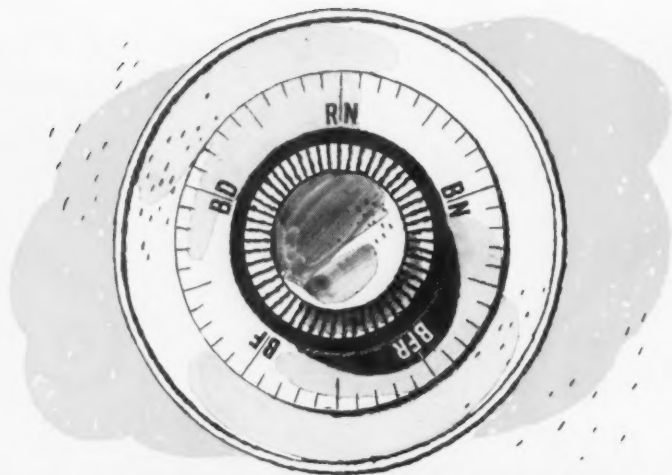
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November, 1957

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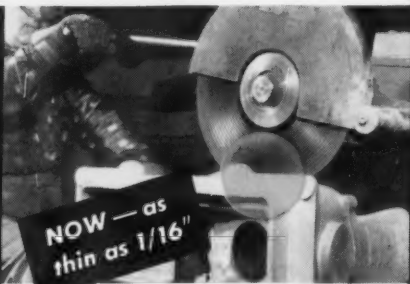
## Your "RIGHT COMBINATION" for countless grinding jobs

### *The BIG 5 in Reinforced Wheels*



#### **RN WHEELS — Glass Cloth**

New — for the foundry and lower priced! Norton has been field-testing a new rubber-bonded-reinforced wheel. It's ready now and well worth your investigation for savings in your cutting-off operations on ferrous and non-ferrous metals.



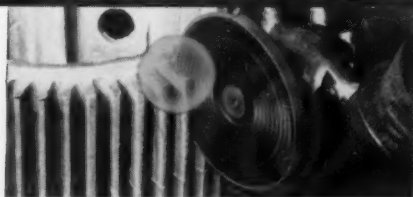
#### **BN WHEELS — Glass Cloth**

Ten inch diameter wheels can now be had 1/16" and 3/32" thick. In this range specify A36TBN. For heavy duty work, requiring larger and thicker wheels, specify A24R14BN. Use them for slotting, for cutting-off non-ferrous metals, wire rope, many non-metallic materials.

# SUBLAND TOOLS—

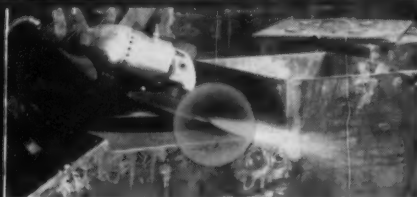
(Standard and Special)





### **BD WHEELS — Glass-Nylon**

For fastest cutting on right-angle grinders you'll want the glass cloth reinforced resinoid bonded hub wheels of rigid type. Use for medium to heavy weld grinding and smoothing flame-cut edges. Specify A24NBD for fast cut, A24QBD for long life. For cutting-off, A24RBD which is Nylon reinforced.



### **BFR WHEELS — Cotton-Nylon**

Top performers for light, portable grinding. These semi-flexible resinoid wheels have cotton fabric with an additional layer of Nylon for added safety. Specify A24KBFR for weld smoothing, removing scale, light finishing, minor cut-off jobs, etc.

**Norton Reinforced  
Wheels are built in  
many different varieties  
... to add the  
"TOUCH of GOLD"  
in many different ways**

There's no limit to what the complete line of Norton reinforced wheels can do for you, in the widest range of everyday grinding jobs — from light deburring to heavy cutting-off.

That's because each type combines exactly the right abrasive, reinforcing web and bond to assure exceptional strength and safety — plus fast, cool, trouble-free performance. Remember: only Norton offers you such long experience in both grinding wheels and grinding machines ... which means these particular wheels are sure to bring you the money-saving, value-adding "Touch of Gold" on job after job, day after day.

#### **Also, Reinforced**

#### **Mounted Wheels and Sticks**

are available. Here we show just five of the popular reinforced wheel types. For plenty of further facts, read our Booklet No. 1748. Get it from your Norton distributor — together with fast, helpful service. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.



### **BF WHEELS — Cotton**

These resinoid straight wheels with cotton fabric reinforcement are "the right combination" for peripheral grinding, do a fine job of deburring and finishing. Fine for blending and smoothing light welds. Also available in mounted wheels and sticks.

W-1815



*Making better products...  
to make your products better*

#### **NORTON PRODUCTS**

Abrasives • Grinding Wheels • Grinding Machines  
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#### **BEHR-MANNING DIVISION**

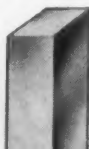
Coated Abrasives • Sharpening Stones  
Behr-cal Tapes

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November, 1957

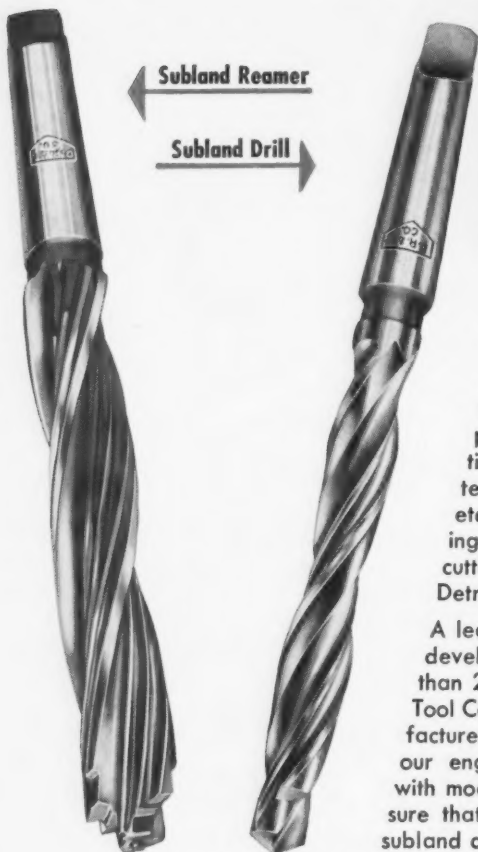
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**modern  
machine  
shop**



# SUBLAND TOOLS—

(Standard and Special)



**Reduce  
SET-UP  
TIME,  
Cut  
PRODUCTION  
COSTS**

To produce more work in less time and at reduced costs, modern production methods often require multi-diameter tools that perform a combination of operations with each pass—drill-counterbore, drill-ream, drill-chamfer, etc. Your best bet for accomplishing these objectives are subland cutting tools, precision produced by Detroit Reamer & Tool Company.

A leading participant in the original development of subland tools more than 25 years ago, Detroit Reamer & Tool Company has been a major manufacturer of such tools ever since. Thus, our engineering experience combined with modern manufacturing facilities assure that you receive the finest quality subland cutting tools.



## DETROIT REAMER & TOOL COMPANY

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*Magic?*





# modern machine shop

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**modern machine shop**  
431 Main St. Cincinnati 2, Ohio

November, 1957



## EXTRA CUTTING LIFE

You get more cuts per bit, more cuts per dollar when you use du Mont Tool Bits.

That's because du Mont steel has an extra fine grain structure, *precisely balanced in toughness, in wear resistance, in red hardness.*

Fill in the coupon for full information.

## du MONT TOOL BITS

*High Speed, Ground Square  
& Rectangular*

### MAIL TODAY — SAVE TOMORROW

The du MONT CORPORATION, Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON CHART,  
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Name.....

Company.....

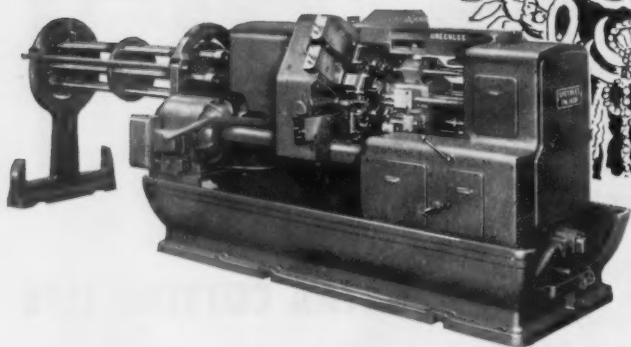
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# MOST DRILLING PER DOLLAR!

# Magic?



## No...Just Greater Flexibility!



### AUTOMATIC BAR MACHINES

For Threading . . . Tapping . . . Reaming



Write today for catalog A-405. Please submit print when inquiring about a specific job.

The greater flexibility of Greenlee Automatic Bar Machines enables you to reduce idle machine time. Greenlee simplified camming results in fast setups for short-run jobs . . . long operations are easily split for more effective machining time. Investigate! Call in Greenlee Engineers for complete information.



**GREENLEE BROS. & CO.**  
1891 Mason Avenue  
Rockford, Illinois

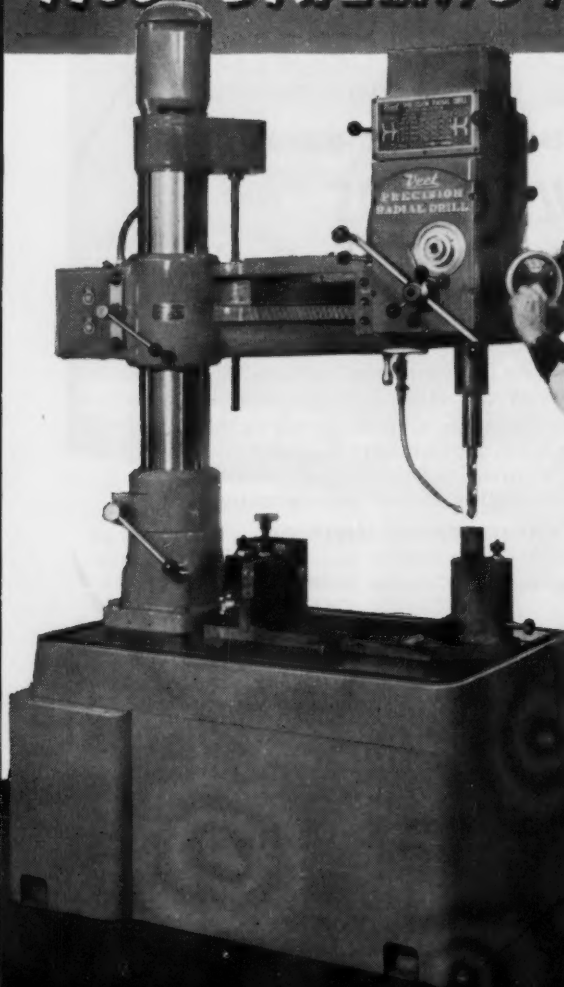
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54 modern machine shop

November, 1957

*Plastic Shop reports:*  
**quality up, scrap loss down**

**MOST DRILLING FOR A DOLLAR!**



***Veet***

*3 foot*

**RADIAL**

**\$3370<sup>00</sup>**

F.O.B. DETROIT

**NOW!**

**QUICKER  
DELIVERY**

**RADIAL MOBILITY AT THE PRICE  
OF A FIXED SPINDLE DRILL!**

Send for brochure describing VEET'S 16 Points of superiority

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BY

***Veet*** **INDUSTRIES**

TELEPHONE PRescott 6-3000

EAST DETROIT, MICH.

**MAN AT WORK! MAKING MONEY!**

"in the production of



*Plastic Shop reports:*  
**quality up, scrap loss down**  
**with DENISON 1-ton hydraulic**  
**MULTIPRESS**

**Problem:** How to get constant hold-down pressure for foil marking plastic panels and control knobs. The Rohden Manufacturing Company, Chicago, Illinois, was getting too many rejects using air presses for this job.

**Solution:** They installed a Denison 1-ton hydraulic Multipress—equipped it with the same foil marking head.

**Results:** Because of uniform ram pressure on the hydraulic Multipress, hold-down of the foil marking head is now identical from piece to piece. Scrap loss is eliminated... output increased substantially to reduce manufacturing cost.

**DENISON ENGINEERING DIVISION**

American Brake Shoe Co.

1254 Dublin Road • Columbus 16, Ohio



*Uniformly marked plastic control knobs turned out quickly, at low cost on a Denison 1-ton hydraulic Multipress with foil marking head.*

**Manufacturers ...**  
**Free 30 day trial**

Try the Denison 1-ton hydraulic MULTIPRESS in your plant at no cost or obligation! Write us for details.

Denison, Denison HydrOilics, and Multipress are registered trademarks of Denison Eng. Div., ABSCO

**DENISON**  
*HydrOilics*

**HYDRAULIC PRESSES • PUMPS •  
MOTORS • CONTROLS**

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# MAN AT WORK! MAKING MONEY!

"in the production of  
special precision  
parts...."

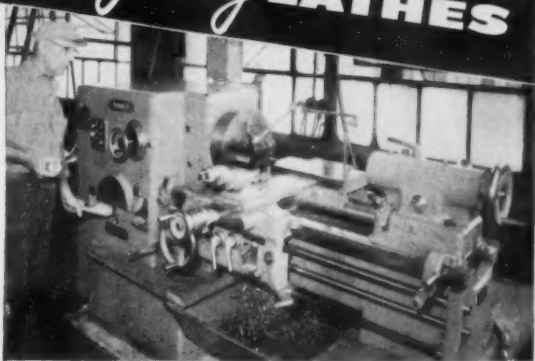
HENRY VOGT MACHINE CO.  
LOUISVILLE, KY.

depend on

## SIDNEY *Heavy-Duty* LATHES

The scales turn in favor of SIDNEY HEAVY DUTY LATHES on any type of work . . . turning standardized "mass production" work in impressive quantities . . . or turning special precision parts, as illustrated in this photograph. Henry Vogt Machine Co. makes forged steel valves and fittings, water tube boilers, refrigerating machinery and other equipment.

The type or quantity of work doesn't phase these lathes . . . it's all part of the "cost-less, produce-more" story.



AUTOMATIC, HYDRAULIC DIAL CONTROLLED CHANGE  
32 SELECTIVE SPINDLE SPEEDS IN GEOMETRIC PROGRESSION

—one of the many Sidney "firsts" which have  
been making history as far back as 1947.

SIDNEY LATHES are precision tools, designed for rigidity, accuracy and dependability, regardless of the severity of the operation performed. Exceptionally smooth and quiet. A size and speed available for your plant.

Write for bulletins or for representative to call at your convenience.

**THE SIDNEY MACHINE TOOL CO. • SIDNEY, OHIO**

*Builders of Precision Machinery since 1904*

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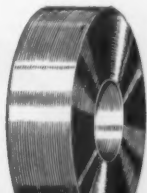
November, 1957

modern machine shop 57

**from cold strip to finished tubing**

**IN SECONDS!**

**with a YODER**





# Heller multi-kut File

*hogs off metal yet  
leaves a smooth finish*

**AMERICA'S MOST VERSATILE FILE!** It can be used on many jobs; filing stainless steel, cast iron, aluminium, brass, bronze, magnesium, plastics and other materials . . . even filing brass and steel interchangeably without dulling.

**HELLER MULTI-KUT FILE FEATURES** include: *bastard teeth spacings* for removing the most stock per stroke . . . *chip breaker rows* to reduce loading and speed filing . . . *broad chisel teeth* to generate smooth surfaces.

**SEEING IS BELIEVING!** Comparative on-the-job tests prove that Heller Multi-Kut files do the work of Hand, Mill and Flat bastard files, also Brass files . . . giving better results at lower cost.

## HOLLER FOR HELLER

*... and reduce  
filing costs!*

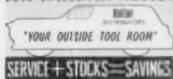
Cost reduction programs call for such original Heller file developments as Nucut "Wavy Teeth" — "Multi-Kut" — "Spiral-Cut" Half-Round and others. All are designed to give you more filing per dollar . . . with smaller tool crib inventories. Ask your Heller Distributor to help you set up a shop test of Heller Files against all comers. You'll come out dollars ahead.



## Heller Tool Co.

AMERICA'S OLDEST FILE MANUFACTURER, NEWCOMERTOWN, OHIO—Subsidiary of Simonds Saw and Steel Co.

SOLD EXCLUSIVELY THROUGH



ROTARY FILES

HACK SAW BLADES

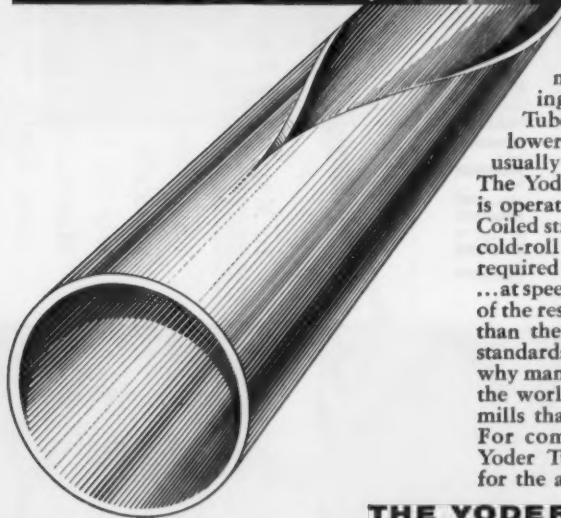
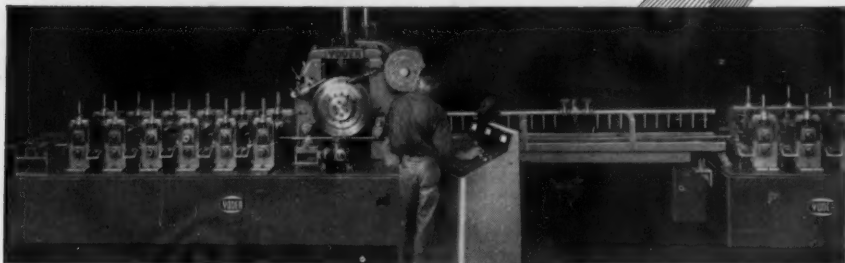
METAL CUTTING BAND SAWS

FLAT GROUND DIE STEEL

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**from cold strip to finished tubing**  
**IN SECONDS!**  
**with a YODER**  
**ELECTRIC-WELD TUBE MILL**




One of the fastest . . . and one of the least expensive . . . methods of making steel tubing is with a Yoder Electric-Weld Tube Mill. Scrap losses are far lower than any other method . . . usually less than 2%.

The Yoder Type-M Mill shown above is operated by one man and a helper. Coiled strip on this mill is continuously cold-roll formed, welded and cut to required lengths in a matter of seconds . . . at speeds up to 340 f.p.m. The quality of the resulting tube is *constantly* better than the requirements of commercial standards. This is one of many reasons why manufacturers and users of tubing the world over are using more Yoder mills than all other makes combined. For complete details, write for the Yoder Tube Mill Manual. It's yours for the asking.

**THE YODER COMPANY**

5532 Walworth Avenue • Cleveland 2, Ohio

	PIPE AND TUBE MILLS (ferrous or non-ferrous)
	COLD ROLL FORMING MACHINES
	ROTARY SLITTING LINES

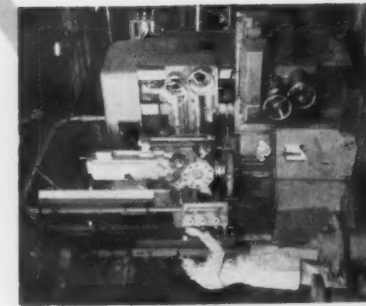
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November, 1957

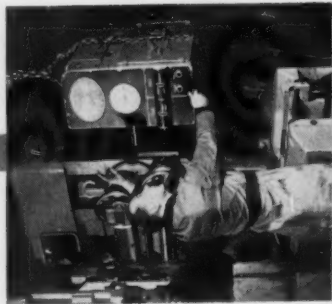
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## Can Your Surface Grinder Do This?

Hold .0005"  
Accuracy and  
.0002" R. U. V.



36" Bullard Cut Master V.T.L.  
Model 75 manually controlled  
from Pendant Control.



Bullard Service Engineer guides  
Man-Au-Trol Conversion Unit  
into place.

*no need for Obsolescence  
with*

**BULLARD**

**VERTICAL TURRET LATHES**

*Model 75*

In May, 1955, Hyster Company, Peoria, Illinois, installed a 36" Cut Master V.T.L., Model 75 and by the end of 1956 it was evident that due to increased requirements an automatically controlled machine was necessary. *Did this obsolete the Cut Master?* — No sir — it only meant adding a Man-Au-Trol Conversion Unit to Cut Master right in their plant. *And it was accomplished in only four days.* No need to obsolete Bullard Cut Master, Model 75 — just convert them.

*another way to cut costs when  
cutting metal* **BULLARD**

bsolute Bullard Cut Master, model 19 — just convert them

Bullard Service Engineer guides  
Man-Au-Trol Conversion Unit  
into place.



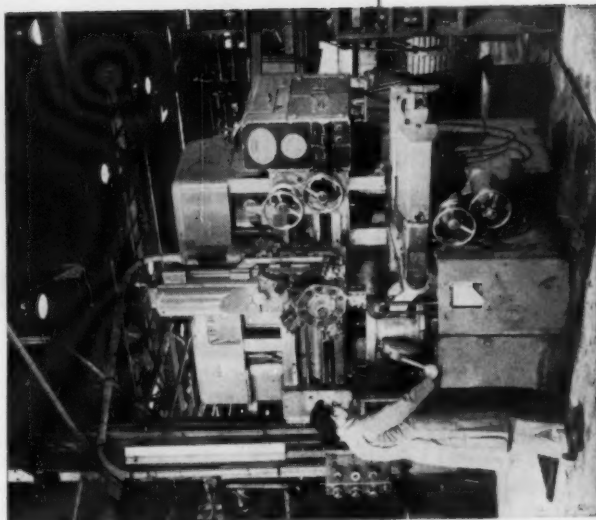
Electrical connections for Man-Au-Trol are wired into Cut Master Control Panel.

For the complete information on Bullard  
Vertical Lathes call our nearest Sales  
Office or Distributor.

## THE BULLARD COMPANY

B R I D G E P O R T 9 , C O N N E C T I C U T

*another way to cut costs when  
cutting metal — buy BULLARD*



Man-Au-Trol installed for automatic control of Turret Head.

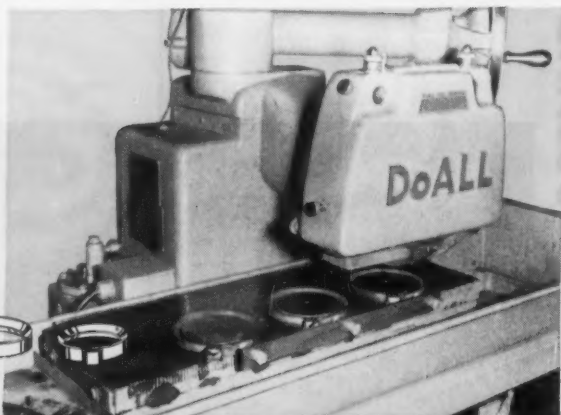


### THREAD MEASURING WIRES

▼ Standard  
equipment  
everywhere

Can Your Surface Grinder Do This?

Hold .0005"  
Accuracy and  
.0002" Parallelism  
in One pass  
over these 3 1/2"  
diameter rings



**The DoALL GRINDER Does IT EVERY TIME!**



Here's another "proof positive" success story for DoALL surface grinders! The Taber Instrument Corporation of North Tonawanda, N. Y., subcontracts the precision surfacing of helicopter rings which have to be held to "tenths."

Forged and heat-treated rings come to the Taber plant slightly warped, where the grinding operation not only has to provide flat parallel plane surfaces for subsequent machining operations but also bring the thickness to the desired finished size. Using an ingenious fixturing device, the operator surface grinds one side using 1/32" cross feed and a .005" deep cut. The other side of the rings are then ground to bring them to final size in one pass holding dimensional accuracy consistently to .0005" and parallelism to within .0002".



**ASK FOR A FREE DEMONSTRATION**  
—Compare a DoALL with any surface grinder in your shop. See it in operation on a DoALL demonstration unit right in your own plant. Call your local DoALL Store or write.



**FREE CATALOG**—Shows design and construction of DoALL Grinders, accessories including "Cool Grinding."

**The DoALL Company, Des Plaines, Illinois GR-215**

Call Your **DoALL** Service-Store

 Machines and Blades	 Surface Grinders	 Power Saws	 <b>DoALL SAW BANDS</b>	 <b>MEASURING INSTRUMENTS</b>	 <b>SHOP SUPPLIES</b>
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MACHINE TOOLS ..... CUTTING TOOLS ..... INSTRUMENTS ..... IN STOCK

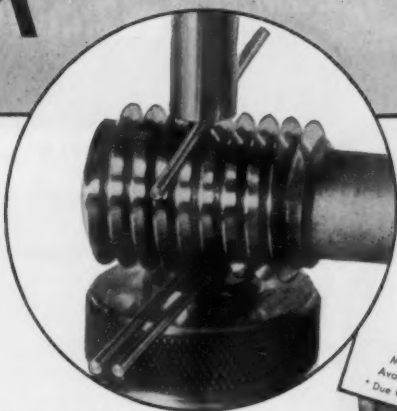
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**A NEW LINE OF DAKE**  
*air hydraulic* **PRESSES**

# VK

## THREAD MEASURING WIRES

▼ Standard  
equipment  
everywhere



Checking pitch  
diameter of thread  
gage by three wire  
method on VK Light Wave Micrometer.

Every set of VK Standard Thread Measuring Wires, in addition to being within .000020" of best size, is now calibrated and furnished with matching constant. In many cases this will result in considerably more accurate pitch diameter measurements. These wires are the accepted standard equipment for making pitch diameter measurements of taps, thread gages, precision threaded parts, hubs, worms, splines and gears. For the great majority of 60° Unified and American threads, the Set No. 20 H.S. pictured at the right will fill your needs. Similar sets to  $\pm .000020''$  accuracy are available for single-start threads of other pressure angles. For threads which have a lead angle greater than five degrees, or multiple-start threads and worms, special size wires should be used.

VK STANDARD  
THREAD WIRES  
Now up to **75%**  
**INCREASED ACCURACY**  
IN YOUR P.D. MEASUREMENT  
For all standard Unified and American  
Threads 2 to 80 P  
When you order the NEW  
VK CALIBRATED  
THREAD MEASURING WIRES  
WITH MATCHED CONSTANTS

Max. Theor. Meas. P.D. Error\* = .000015"  
Available from stock at no increase in price.  
\* Due to effect of wire diameter



Set No. 20 H.S.  
Thread Measuring Wires

Set No. 20 H.S. Thread Measuring Wires is a plant necessity for maintaining taps and thread gages within their limits for wear and for proving the pitch diameter of screws and threaded parts.

Price, High Speed Steel Wires...\$135.00

Special wires from .002" to 2.000" diameter are made to any tolerance required.

Send for a copy of the new, 258-page Van Keuren Catalog and Handbook No. 36 containing valuable technical and engineering information on measuring problems and methods. Address:

# VK

38th YEAR

THE *Van Keuren* co.,

175 WALTHAM STREET, WATERTOWN, MASS.

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . .  
Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master  
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Carbide Plug Gages . . . Carbide Pins . . . Precision Lapping Services.



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November, 1957

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# A NEW LINE OF **DAKE** *air hydraulic* **PRESSES**



## FOUR NEW MODELS

**25 TONS** provides easy operation, low cost, and speed for general pressing and production work.

**50 TONS** for assembling, straightening, bending in minimum time.

**75 TONS** for handling heavy-duty press jobs quickly and easily. Ideal for machine shops, tool and die shops.

**150 TONS** for extra-heavy press work in heavy industry. This press is recommended for construction work, fabrication, and repair work requiring extra-heavy pressures.

## CHECK THESE IMPORTANT **DAKE** FEATURES

- ✓ **Rapid Ram Approach**—automatically changes to power stroke when it contacts the work.
- ✓ **Movable Workhead**—self-contained, easy to center over work. Workhead can be purchased separately.
- ✓ **Modern Design**—all of the operating controls are at convenient working height.
- ✓ **Extra Long Stroke**—handles long pressing jobs more easily.

**DAKE CORPORATION**, 612 Seventh Street, Grand Haven, Michigan



Arbor Presses



Hand-Operated Hydraulic



Power-Operated Hydraulic



Guided Platen

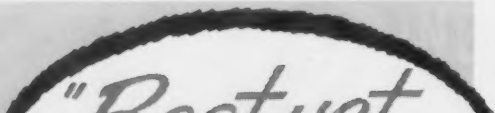


Gap Type Presses



Movable Frame

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## How to Relax

If you're all tied up in knots over the high cost of operations, there's an easy way for you to break the tension. Put CIMCOOL® to work in your plant and dreams of increased production and lower costs will become realities. You'll relax with the knowledge that CIMCOOL Concentrate is taking care of your cutting fluid problems. Here's why:

- **CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.
- **CIMCOOL DOES A BETTER JOB** because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.
- **CIMCOOL IS CLEAN**, doesn't soil clothing or hands. It contains no skin irritants. It leaves no slippery film on shoes, floors, machines or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

Consult your CIMCOOL Distributor. Or contact us direct. Write, wire or telephone Sales Manager Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

### CIMCOOL CUTTING FLUIDS

**CIMCOOL Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

**CIMCOOL Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

**CIMPLUS**—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

**CIMCUT Concentrates**—For jobs requiring oil-base cutting fluids. Added to mineral oils, they give economical mixes for higher speeds and feeds.

**CIMCOOL Bactericide**—The most effective agent yet developed to overcome rancidity and foul odors.

**CIMCOOL Machine Cleaner**—The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

# CIMCOOL

## Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

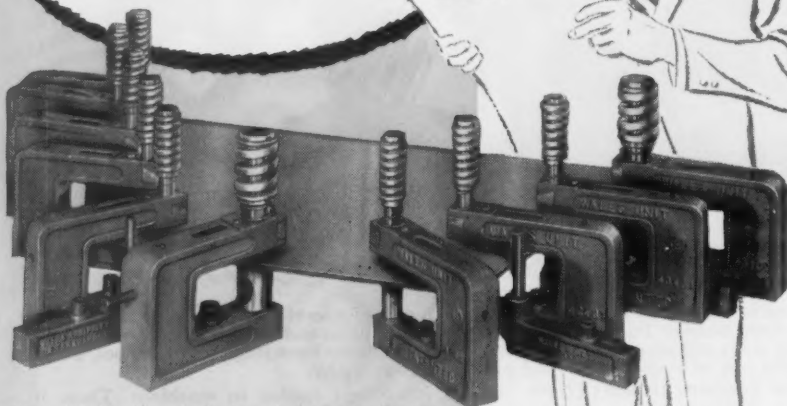
## HERE'S PROOF OF PERFORMANCE...

"Our Men Use

CLANSING MILLS



*"Best yet..."*  
**for Heavy Duty**  
**HOLE PUNCHING**  
 up to  $\frac{1}{4}$ " steel"



"Our CJ Tooling is fast and clean for heavy duty work on sheets, and we're also getting big profit from punching holes in channels, angles etc. That's a tough proposition for the average shop . . . but not for us! With our WALES equipment we cut vees and corner notches at the same time. It really boosts our production."

WALES CJ Units punch unlimited straight line, staggered and scattered patterns . . . round or shaped holes. Die retention design features rapid die change **WITHOUT REMOVING UNIT** from set-up . . . provides controlled slug ejection. Time saving and money saving. Same units may be used over and over again in other patterns.



**SEND FOR  
 BULLETIN NO. 20K**

Shows actual job work  
 and complete data  
 of CJ sizes.

**WALES Strippit COMPANY**

A UNIT OF HOUDAILLE INDUSTRIES, INC.

**AKRON; NEW YORK**

WALES-STRIPPIT OF CALIF., SOUTH GATE, CALIF.  
 WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONT.

**"...the Wales-Way is the PLUS-PROFIT way"**

For more data circle 367 on Reader Service Card

# HERE'S PROOF OF PERFORMANCE...

## "Our Men Use CLAUSING MILLS for every job that has to be on the nose"

*"Our men use Clausing vertical mills rather than our larger, more expensive machines for every job that has to be 'on the nose'. We have yet to find a more accurate mill."*

Wayne Fabricants  
Ontario, New York

This report is typical of the experience of hundreds of users. The CLAUSING VERTICAL MILLER is a precision machine tool especially designed for general production milling . . . pattern, experimental and tool room use. Many new and exclusive features give it greater versatility, ease of set-up and operation than have ever been available in a miller at or near its price — only \$835.00.

*And Clausing is the most accurate machine of its type and capacity.*

Before it leaves the factory each CLAUSING Mill must pass rigid tolerance tests such as:

1. Top of table perpendicular to column ways within .0005" in 6" travel.
2. T-slots square with cross slide dovetails within .0005".
3. Table, parallel to turret within .001".
4. Spindle square with table, front to rear, within .001" T.I.R. in 5" circle.
5. Spindle taper (internal) run out within .0002 at spindle nose.
6. Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.

MILLS, DRILLS, BORES, REAMS, SHAPES  
AT ALL ANGLES . . . WITH ONE  
WORK SET-UP!



The heart of the CLAUSING MILL is its rigid, high precision spindle head. It has 7 ball bearings . . . spindle is chrome nickel steel, hardened and ground . . . quill, ground and hard chrome plated, has full-length bearing seat . . . overarm is an electric furnace casting, with  $\frac{3}{4}$ " thick walls, precision ground. Quill has micrometer depth control stop and two feeds, lever and hand wheel.

### CONDENSED SPECIFICATIONS

Size of Table	6" x 24"	Vertical Table Travel	11 $\frac{1}{2}$ "
Longitudinal Table Travel	15"	Max. Distance Spindle to Column	8 $\frac{3}{4}$ "
Cross Table Travel	5"	Spindle Travel	3"

Spindle Speeds: Six, 180 to 3250 RPM. No. 7 Brown and Sharpe or No. 2 Morse Taper Spindle Optional. Operates from  $\frac{1}{2}$  to  $\frac{3}{4}$  H.P., 1725 RPM motor.

WRITE FOR ILLUSTRATED LITERATURE

**CLAUSING DIVISION • ATLAS PRESS COMPANY**  
**11-110 N. PITCHER ST., KALAMAZOO, MICHIGAN**

For more data circle 368 on Reader Service Card

November, 1957

modern machine shop 67

**DETROIT-TOOLED**

# GET ARMCO STAINLESS BARS

when, where and how you need them

...from independent steel distributors

When you need Armco Stainless Steel bar stock and need it *now*, a call to your independent steel supplier can pay off. Same-day service is ordinary; delivery in hours is often possible.

Where do you need your stainless bar and wire? It's a fact that your independent supplier may be able to put steel where you need it faster than you could get it from your own inventory.

How much time must you spend and what will be the scrap loss before stainless bar or wire

from your inventory is ready to use? That's how much you'll save by buying steel *tailored* to your needs by your steel supplier.

## Wide Selection

More than 30 standard and special grades of Armco Stainless Steel bars and wire—in a wide range of shapes, sizes and conditions—are available through independent distributors. There's one near you. Just write us for his name.

## Armco Steel Corporation

2286 CURTIS STREET, MIDDLETOWN, OHIO

Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

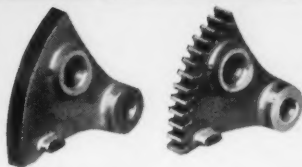
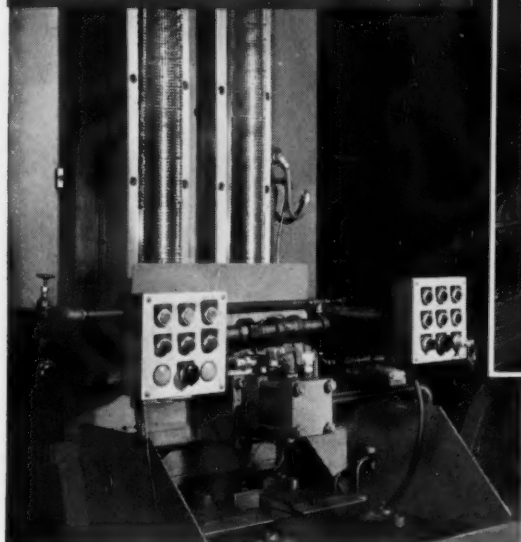


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IN POWER SQUAKING SHEARS...

Eruehauf picks Niagara for

## DETROIT-TOOLED



## BROACHES 300 SECTOR GEARS PER HOUR FOR Whirlpool AUTOMATIC WASHERS

Whirlpool Corporation's Clyde Division, in Clyde, Ohio, produces automatic and conventional washers. More than a million square feet of manufacturing area, approximately 2,500 employees and the most modern methods and equipment are used, including this Detroit Broaching operation:

**PART:** Sector gear, gray cast iron.

**MACHINE:** Detroit Vertical Single Ram, 10-ton broaching capacity, 54-inch stroke.

**OPERATION:** Broach outer radius and thirteen 10-pitch, 20 degree involute gear teeth.

**CYCLE:** Load two parts over locating pins; cycle-start causes table to travel forward, actuating hydraulic bridge clamp; clamping

action energizes pressure switch, which causes ram to descend, broaching both parts; limit switch at bottom of stroke signals ram to rise, fixture to unclamp and table to shuttle out for unloading and reloading.

**STOCK REMOVAL:** Depth of cut—.234" to .236". Length of cut—19/32".

**HOURLY PRODUCTION:** 300 parts at 100% efficiency.

Note the oversize table, allowing this single slide machine to produce two parts at each ram stroke. This is typical of Detroit machine design and tooling efficiency. Let our engineers specify the right machine, the most efficient tooling and the proper degree of automation to solve your problem. Send parts or prints for prompt recommendations.

**DETROIT BROACH & MACHINE COMPANY**  
DEPARTMENT K-11 • ROCHESTER, MICHIGAN

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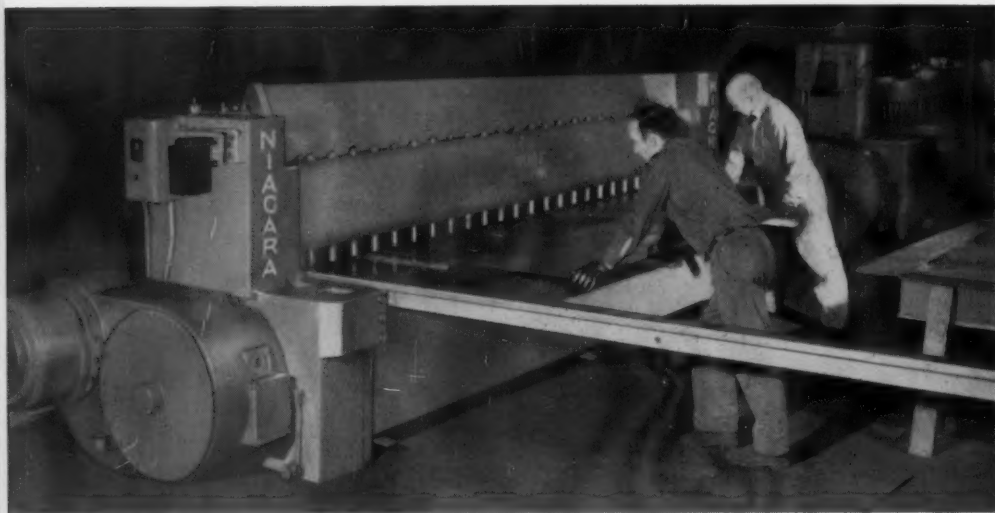
November, 1957

modern machine shop 68a

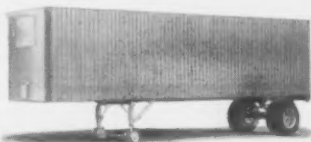
"exceptional machine value"

IN POWER SQUARING SHEARS...

# Fruehauf picks Niagara for



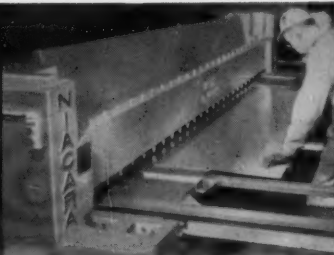
Niagara Model 912 shearing 18" x 30" transition plates from 10 gage hot-rolled steel for tank trailer frames.



Niagara Model 96 cutting forty 4" x 6" trailer gussets per minute from  $\frac{3}{8}$ " and  $\frac{1}{2}$ " bar stock.



Niagara Model 812 shearing 11 gage hot-rolled steel to 36" x 144" for trailer floor beams.



Niagara Model 812 at work shearing 24 gage stainless steel to 4' x 6'6" for van trailer door panels. Production: 2.7 pieces sheared all 4 sides per minute.

## **NIAGARA** power squaring shears

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

Now, all former hot rolled  
Crucible BEX high speed rounds



# "exceptional machine value"

**World's largest trailer manufacturer spells out its reasons for using Niagara Underdrive Shears in producing a wide variety of parts from cold-rolled and hot-rolled steels, stainless and aluminum**

As a metal fabricator, Fruehauf Trailer Company is well-qualified to speak. It not only manufactures every conceivable type of commercial trailer, but "builds more of them than any company in the world."

So, when it comes to power squaring shears, Fruehauf is particularly qualified to speak. Using several Niagara Models, it considers them an "exceptional machine value."

Enlarging on the point, Fruehauf engineers say, "Niagara Shears are capable of holding straight lines within thousandths of an inch . . . they keep their settings . . . trouble-free, they require a minimum of maintenance."

"They're well-balanced . . . can be moved about . . . require no special concrete base. We especially like

their minimum height . . . can see over them. It's unlikely that an operator will step out from the shear in the path of a fork lift."

Like Fruehauf, progressive companies everywhere look to Niagara for exceptional machine value in a power squaring shear. Here are a few of the reasons:

**TAKE ACCURACY!** Niagara's positive, power actuated, self-compensating holddown grips work securely. Fully closed box section construction of bed, crosshead, holddown and housings resists all stresses with minimum deflection.

**TAKE SPEED!** More working strokes per minute and instant engagement of Niagara's exclusive multi-point sleeve clutch assure more cuts per hour. Full visibility of the cutting line, ease of operation, quick setting gages and safety features boost hourly output.

**TAKE MAINTENANCE!** Niagara Shears are built to stand the gaff on the toughest jobs. Simplicity of design involving a minimum number of parts, and utmost accessibility cut out costly maintenance.

Any way you look at it, Niagara has the most to offer you in modern shear performance.

## NIAGARA'S NEW, FACT-FILLED BULLETIN WILL GIVE YOU THE FULL STORY



74 Pages — 141 Illustrations . . . Most Comprehensive Shear Bulletin Ever Published . . . 19 Photo Reports of Niagara Shears in Action . . . 44 Revealing Views of Niagara Shear Features . . . Easy-to-read Specs For America's Most Complete Underdrive Line (59 Models, Capacities: 16 gage to 1", Cutting Lengths: 4' to 20')

### CLIP THIS COUPON FOR YOUR COPY TODAY!

see what America's most modern  
power squaring shears  
can do for you

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

**MAIL** your new Underdrive Squaring Shear Bulletin 69G  
to us immediately.

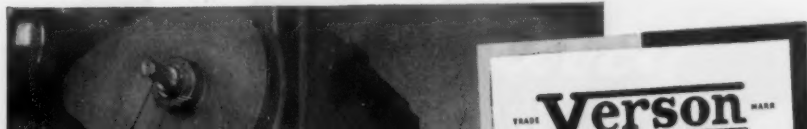
NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

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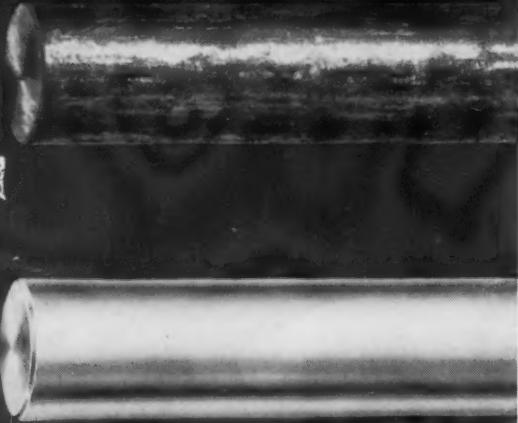
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

NAME



Now, all former hot rolled  
Crucible REX high speed rounds  
supplied with a new thrift finish

*for the price  
of this  
you get this*



Here's a revolutionary, new Crucible policy designed to provide an improved product—save time and processing costs. Now, Crucible furnishes all REX® high speed rounds from  $\frac{5}{8}$ " up with a machined surface, close to size and free from decarburization. All bars from  $\frac{1}{4}$ " to  $\frac{5}{8}$ " round are supplied cold finished.

This new *thrift* finish means important savings to you — whether you've been paying extra for decarburization and stock removal, or grinding or rough turning rounds in your own shop. Of course, where extremely close tolerances are demanded, precise centerless grinding is still available at a small extra.

It's another Crucible "first" that offers you substantially more for your high speed steel dollar. *Crucible Steel Company of America, Chamber of Commerce Bldg., 7th Ave. and Smithfield St., Pittsburgh 30, Pa.*

**CRUCIBLE**

first name in special purpose steels

**Crucible Steel Company of America**

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

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68d modern machine shop

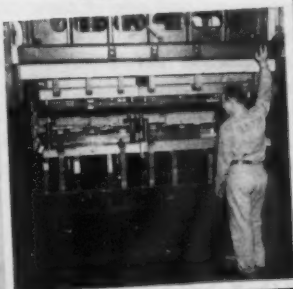
November, 1957





TRADE **Verson** MARK

**OFFERS YOU  
VERSATILITY  
TO MEET THE  
BROADEST  
NEEDS**



A typical job at Westlof Tool & Die Co. — die tryout on progressive tooling. The press is also used for die tryout on Transmat type tooling.

Die tryout for a tool and die shop is probably one of the severest tests of the versatility of a press. At Westlof Tool & Die Co., Detroit, Michigan, a 300 ton Verson double crank, straight side press is used for this purpose.

The press itself incorporates several features which are examples of the versatility Verson engineering can provide: The ram is equipped with three triple bank cushions adjustable right or left to 7" centers.

The bed has two large cushions, one right, one left. All cushions are independently controlled. The press is equipped for application of coil feeding equipment should it become necessary. Press speed is variable from 15 to 30 strokes per minute. Power adjustment of the slide is 15".

If your requirements call for great versatility, bring your problem to Verson. For specific recommendations, just send an outline of your needs.

A Verson Press for every job from 60 tons up.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

**VERSON ALLSTEEL PRESS CO.**

9518 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • 8300 S. CENTRAL EXPRESSWAY, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • Verson-WHEELON HYDRAULIC PRESSES

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November, 1957

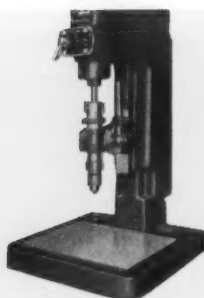
modern machine shop 69



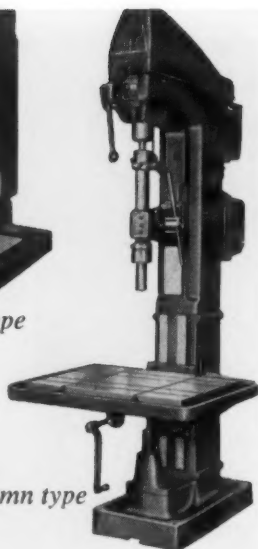
- The many features of our standard drilling and tapping machines can be combined in more than 100,000 different ways—and one of those combinations exactly meets your requirements.

Capacities in cast iron from very small numbered drills to 2"; No. 32 Jacobs chuck to No. 4 Morse taper.

Six or 8 speeds up to 12,000 rpm; 4 feeds.



*Bench type*



*Column type*

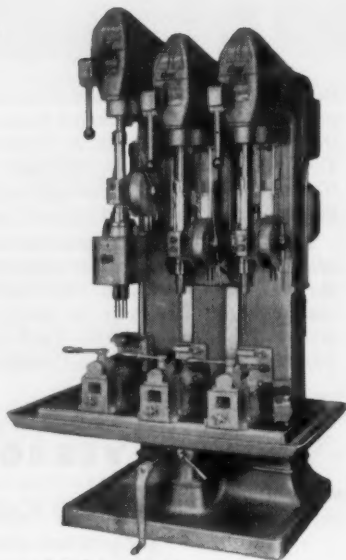
## Avey has the right one

Column or bench type, with wide range of swing, 1 to 8 spindles.

All of our standard drilling and tapping machines include such bonus features as micrometer stop collar, telescoping spindle guard, dynamically-balanced rotating parts, rack-and-pinion-operated motor plate, and our rugged, involute spindle construction.

Tool and die shops like the versatility, accuracy, and speed of our Tool Room machines. They're available with No. 2, 3, or 4 Morse taper. You select the table you need: large (34" x 25"), round (18" diameter), or compound (25" x 12").

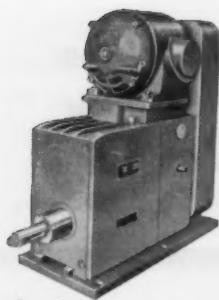
Ask for our literature; or, better yet, ask our representative to help you select the pay-off combination.



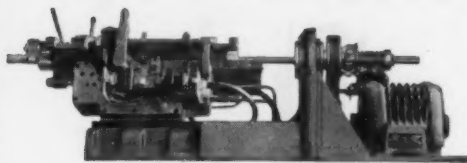
*Multi-spindle*

**Select**

**for accurate spacing**



*Cam feed unit*



*Avey-draulic*

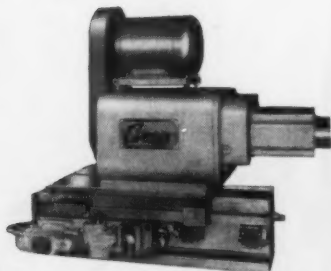


**THE MOTCH & MERRYWEATHER MACHINERY CO.**

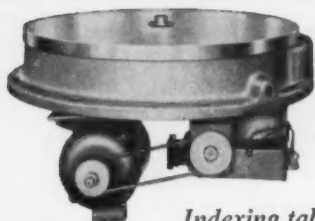
Sharp reductions in unit costs, floor space, machine-handling time, and operating time often make our high-production machines smart investments with fast pay-off periods. They have repeatedly proved this in some of the finest automatic lines in the country.

Our standard units can be combined for either rotary or linear operations. They can be economically re-engi-

## for Avey makes them all



*Hydro-Way unit*



*Indexing table*

neered for successive jobs.

Automatic cam feed units, for drilling, tapping, reaming, hollow milling. Vee belt or gear drive. No. 1, 2, or 3 Morse taper. Mount at any angle. Fully or semi-automatic. Tamper-proof.

Avey-draulic feed unit. Automatic withdrawal for chip removal only when necessary during deep hole drilling. Rapid advance, feed, and rapid return. Standard strokes 12" up to 30".

Hydro-Way unit. 5-20 hp; 12,000 lb. maximum thrust; non-metallic ways. Positive depth control, adjustable feeds, 12" travel.

Automatic index tables. Rapid, accurate indexing to .001", 3 to 100 stations. Even or uneven index patterns. 16" to 48" diameter.

Send us a print of your part, and ask for a profit prediction. Avey Division, The Motch & Merryweather Machinery Co., Box 625, Cincinnati 1, Ohio.

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in production  
in the tool room  
in experimental work

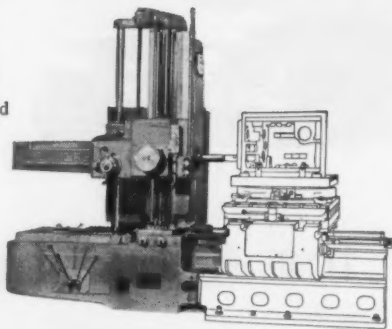
**Select  
a Lucas**

**for accurate spacing  
for precision boring  
for heavy milling**

## Your choice of controls —

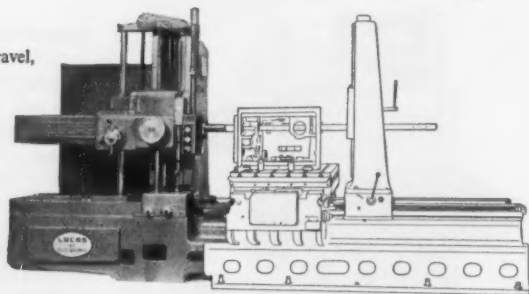
### STANDARD LEVER CONTROLS

available for use with both short bed or backrest models.



### FULL PENDANT CONTROL

of feeds, speeds and directional travel, optional on any Lucas.



Whether you do line or stub boring, whether you prefer lever or automatic pendant control, you get the basic advantages of automatic power positioning and 4-way beds. Whichever model you

select you get the benefit of continuing design improvement, backed by 57 years of specialization and leadership in this field *plus* the full resources of The New Britain Machine Company.

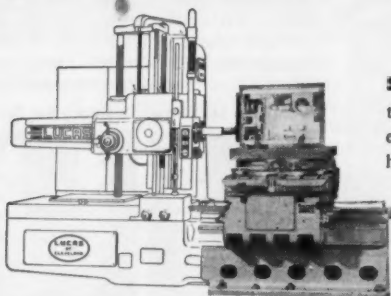
**Up to 40% higher tightening torques keep a  
— and only the combination of an UNBRAKO screw**

The UNBRAKO retains its flow lines



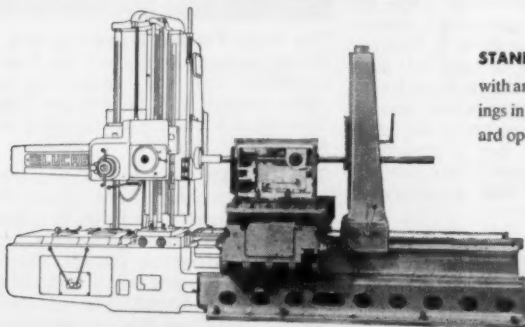
in production  
 in the tool room  
 in experimental work  
 in engineering research  
 in maintenance applications  
 or several, in combination

## your choice of beds



### SHORT BED MODELS

the most compact and economical equipment for precision stub boring, heavy milling and horizontal drilling.



### STANDARD BED WITH BACKREST

with anti-friction bearing mounted bushings in backrest block, handles all standard operations including line boring.



### LUCAS MACHINE DIVISION

The New Britain Machine Company  
Cleveland, Ohio

#### OTHER NEW BRITAIN MACHINE TOOLS DIVISIONS

New Britain-Gridley Machine Division  
New Britain, Connecticut

Hoern & Dilts Division  
Saginaw, Michigan

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November, 1957

modern machine shop 73

**High-Torque UNBRAKO socket set screw tight**  
**and key assures full high-torque performance**

UNBRAKO Set Screw

Ordinary Set Screw

The High-Titan UNBRAKO is accu-

# Up to 40% higher tightening torques keep a

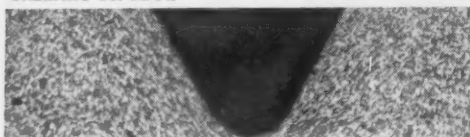
— and only the combination of an UNBRAKO screw

## RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW		MINIMUM DIFFERENTIAL %
		B	C	
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

The High-Torque UNBRAKO socket set screw is made to withstand the highest tightening torques ever used to seat a set screw—up to 40% higher than an ordinary set screw. But to take full advantage of this UNBRAKO feature you must have a key that can apply the force required to seat it without damaging the screw or snapping the key. The High-Titan UNBRAKO hex key is designed specifically to set a High-Torque UNBRAKO so that you can be assured of full *high-torque* performance every time.

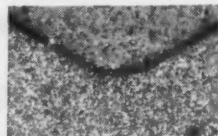
### UNBRAKO Set Screw



Here's why a High-Torque UNBRAKO can be seated tighter—and stay put. It has fully formed threads that make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur.

The UNBRAKO retains its flow lines even when ground down to .010 in. below root diameter. Screws with cut or ground threads lose thread form at root diameter.

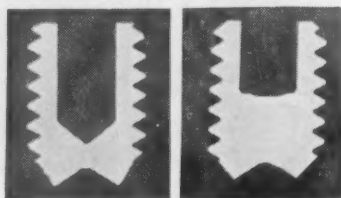
### UNBRAKO Set Screw



The High-Torque UNBRAKO has a radius in the socket corners.

This eliminates the sharp corners where cracks start. It also distributes the stresses developed when tightening torques are applied.

### UNBRAKO Set Screw Ordinary Set Screw



The High-Torque UNBRAKO has a deeper socket which gives you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter.

The High-Torque UNBRAKO is properly heat treated, kept clean. Its grain structure is uniform. It is free of decarburization. There's no danger of stripping the threads or shearing the point when tightening torques are applied. The ordinary screw is suffering from an overdose of decarburization; is full of the telltale white spots that identify it.

And here's why an UNBRAKO High-Titan hex key can be used to apply far more tightening torque to a High-Torque UNBRAKO socket set screw than is needed without damaging either the screw or the key.

The High-Titan UNBRAKO is a precision internal wrenching tool with

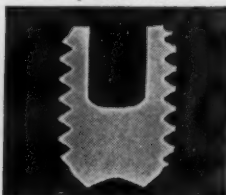


# High-Torque UNBRAKO socket set screw tight and key assures full high-torque performance

UNBRAKO Set Screw



Ordinary Set Screw



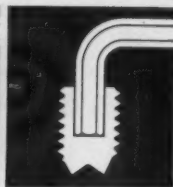
high ductility, specially designed to assure full high-torque performance. It is made of special alloy steel. Its sides are flat and parallel. The corners, which exert torque on the inner walls of the socket, are sharp and tough. The bend is strong.

The High-Titan UNBRAKO is accurately sized across the flats and across the corners to insure snug fit and full wall contact. The square cut end engages the full depth of the socket for greater tightening power. It gives you up to 25% more wrench engagement than a key with a chamfered end.

UNBRAKO Key



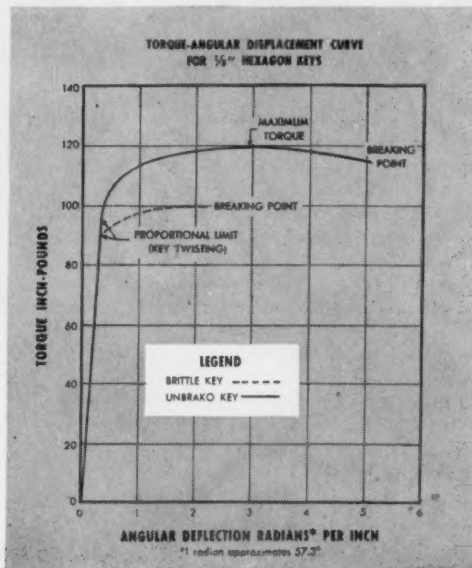
Chamfered End Key



The High-Titan UNBRAKO hex key is heat treated in modern atmosphere-controlled furnaces. The surface is case-hardened without decarburization. The extra hard surface gives the key longer life. And it retains its dimensional accuracy, is tougher and more ductile than ordinary keys. This torque-angular displacement curve for  $\frac{1}{8}$  in. hexagon keys distinguishes a High-Titan UNBRAKO from an ordinary key.

Be sure you get the full high-torque performance offered only by the combination of a High-Torque UNBRAKO socket set screw and a High-Titan UNBRAKO hex key. Both products are stocked by authorized industrial distributors. Ask the one nearest you for complete information. Or write STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.



Unbrako Socket Screw Division



Jenkintown, Pennsylvania

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Cooper Precision Products • Standco Canada, Ltd.  
• Unbrako Socket Screw Co., Ltd.

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November, 1957

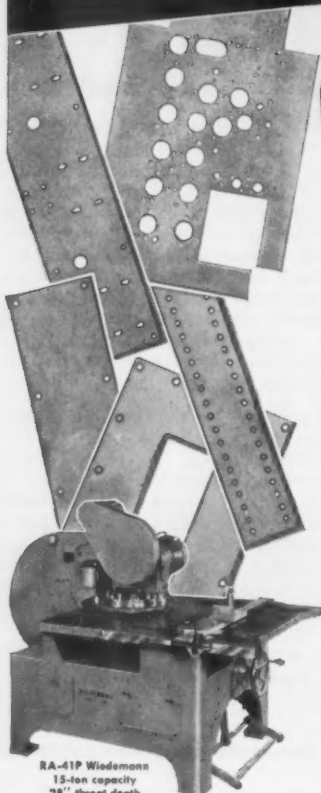
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# SHAPERS

FOR DEPENDABLE LONG  
LIFE AT LOW COST!



# Versatile WIEDEMANN TOOLING Saves You Money



RA-41P Wiedemann  
15-ton capacity  
28" throat depth  
Other presses from 4 to 150 tons

6 typical jobs—total cost of tools shown . . . \$194.80!  
That's just the first of many cost-saving advantages of piercing short run jobs with a Wiedemann Turret Punch Press.

Hundreds of Wiedemann users report 60% to 90% direct savings in production of chassis, panels, side rails, etc.—and engineering changes are reduced to a matter of minutes.

Wiedemann Turret Punch Presses require only one punch and die of a size . . . rounds, squares, louvers, groups, extrusions . . . from 0.093" dia. to 7" square and each is ready for use . . . larger openings and notches are produced easily with a series of "hits". Here is real low-cost tooling flexibility.

Why not prove to yourself how much more you could produce for less with a Wiedemann. We'll be glad to make a time study of your work. Just send prints and ask for Bulletin 201.

*There's a Wiedemann  
for every short run piercing requirement.*

## WIEDEMANN MACHINE COMPANY

4219 Wissahickon Ave. • Philadelphia 32, Pa.

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76 modern machine shop

November, 1957

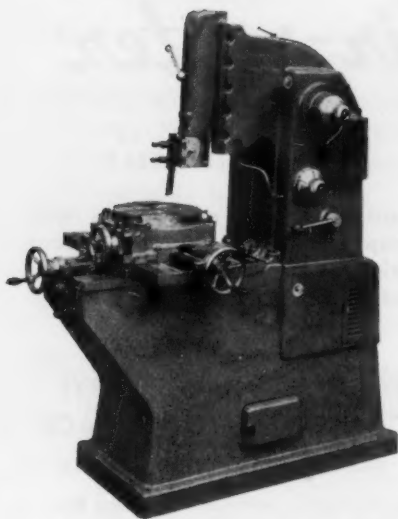
**QUICKLY!**

# SHAPERS

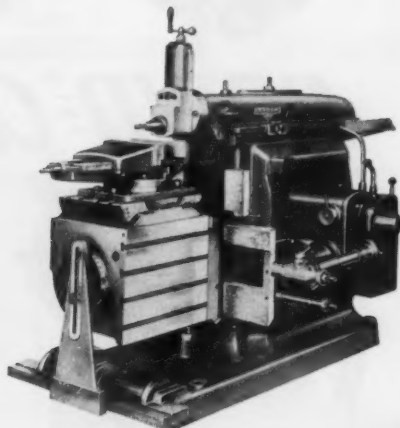
VERTICAL and HORIZONTAL

FOR DEPENDABLE LONG  
LIFE AT LOW COST!

Both precision engineered to  
U. S. Standards.



Chomienne Vertical Shaper . . . 5" stroke . . . with rotary table arranged for free wheeling, direct indexing . . . worm indexing optional. Ideal for sturdy, accurate slotting . . . irregular shapes and forms.



VMA Shapers . . . standard and heavy-duty . . . 14" to 28" stroke . . . automatic lubrication, table power rapid traverse on heavy-duty models.

*Fast service and parts available from major cities.*

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# stop!



**QUICKLY!  
EFFICIENTLY!**  
the **STANDARD**

## **GRIND** Air-rester

7" Unit  
Illustrated



**FOR 7", 8", 10", 12"  
and 14" WHEELS**

Most state safety codes make PURE shop air a MUST! . . . The Standard Grind — Air-rester puts out nothing but pure air . . .

**PROTECTS HEALTH!  
PROTECTS MACHINERY!  
CONSERVES FLOOR SPACE!**

(unit illustrated occupies only 2.4 sq. ft.)

- Renewable, replaceable steelwool filter pads
- Extra large dust collecting chamber
- Removable Clean-out Drawer
- Approved Exhaust Duct
- 3600 RPM Motor—Single or three phase

**STANDARD SETS THE PACE!**

WRITE TODAY FOR FULL INFORMATION

**the STANDARD electrical tool co.**

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**SUPER PRECISION SPINDLES AND MACHINE TOOLS**

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**Nov. 4-8**

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# ARDCOR

## Roll Forming Mills



# stop!

## HIGH BENDING COSTS

Multiple bending on Pedrick Production Benders can materially cut costs on all bending operations for pipe tube or structural metal.

Prove it. Write us your particular problem. Let us supply the cost-cutting answer in terms of pennies per bend. PEDRICK TOOL AND MACHINE CO., Dept. 5, 3640 N. Lawrence St., Philadelphia 40, Pa.



FREE "PEDRICK LINE" BULLETIN.  
WRITE TODAY.

### **PEDRICK**

## production benders

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EXTRAORDINARY PRECISION & QUALITY

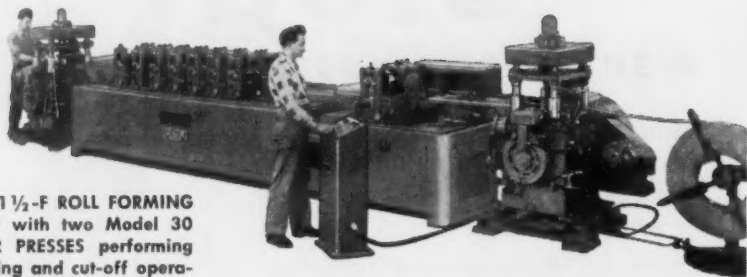
at amazing low cost!

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IMMEDIATE DELIVERY



# ARDCOR Roll Forming Mills



ARDCOR 1½-F ROLL FORMING MACHINE with two Model 30 ARDCOR PRESSES performing pre-notching and cut-off operations.

## COMPARE These Exclusive Features . . . .

UNIT DESIGN — spindles in self-contained SEPARATE HOUSINGS, with speed reducers. Easily removed or replaced.

LARGE RANGE OF VERTICAL ADJUSTMENT through toggle gearing.

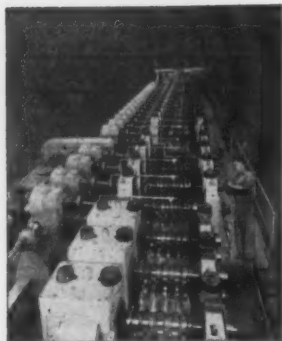
DOUBLE BEARING DESIGN OF DRIVE HOUSINGS adds greatly to rigidity —increases bearing and gear life.

ALL BEARINGS ARE ANTI-FRICTION—no sleeve bearings, even on idler gears.

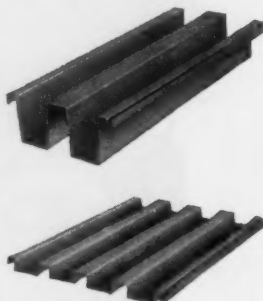
MICROMETER TYPE DIALS assure a positive setting both on drive and out-board housing.

## ONE OF THE LARGEST MACHINES EVER BUILT

### ROLLS FLOORING, ROOF DECK . . .



Left: One of three mammoth ARDCOR Roll Forming Machines designed to form steel roof deck and flooring up to 132 ft. per minute. Entire production line 180 ft. long; approximate weight of equipment, 300 tons.



Consult our Engineering Facilities without obligation . . .

*American* **ROLLER DIE CORP.**

29590 Clayton Avenue

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Wickliffe, Ohio



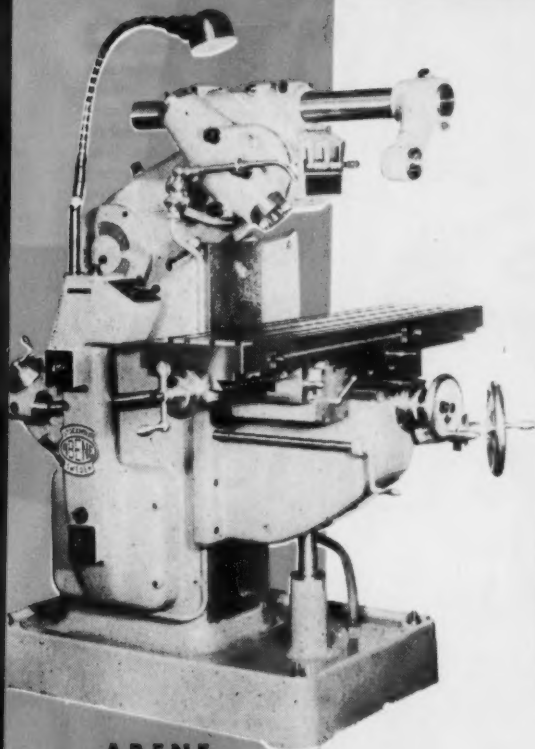
DESIGNERS AND MANUFACTURERS All Sizes and Spindle Diameters of Roll Forming Machines, Welded and Lock Seam Tube Mills • Forming Rolls, Tubing and Pipe Rolls • Straightening, Pinch and Leveler Rolls • Cut-off Machines

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at amazing low cost!

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**ABENE**  
Combined Vertical-Horizontal  
Milling Machines  
**\$3,990.00**

## **AARON MACHINERY CO., INC.**

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**\$2,695.**

**PEDERSEN  
MILLING  
MACHINES**

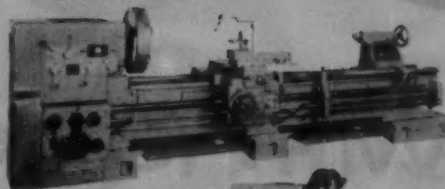
**VPV-2**  
**\$6,890.**



See Page 88

## **IMPERIAL LATHES**

**FLAME HARDENED AND GROUND BED WAYS**



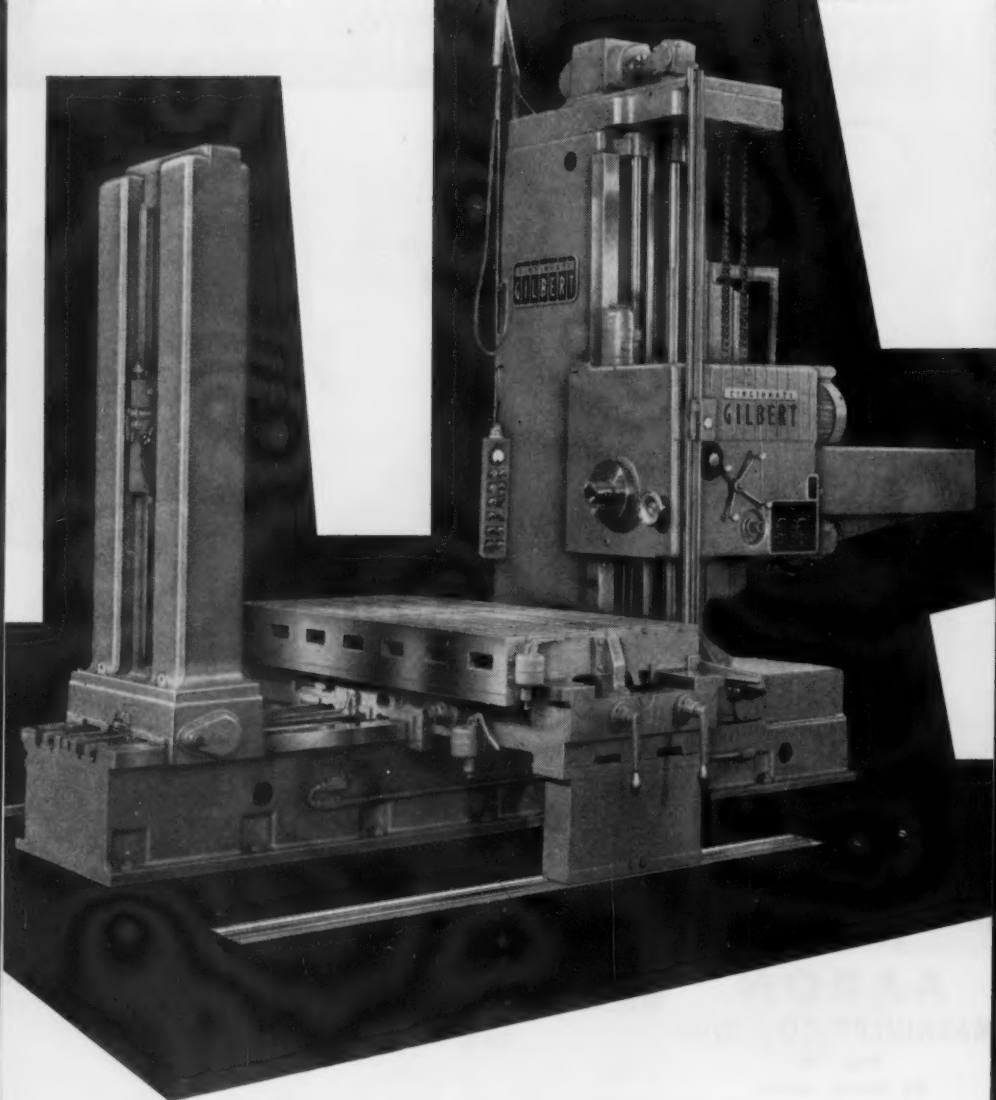
**Model PS — 34/61**  
**SLIDING BED GAP LATHE**  
Swing over ways 34";  
Swing in gap 61"  
**\$12,990.00**

**Model P — 31/46**  
**\$9,790.00**  
Swing over ways 31"  
Swing in gap 46"



Every modern feature that can reduce floor-to-floor time is built into these new Gilbert 4" and 5" boring mills.

For one example, your operator can pre-select speeds and feeds, and power automatic shifting takes over from there. For another,



new 4" and 5"

82 modern machine shop

November, 1957

Lowers Pinion Pro

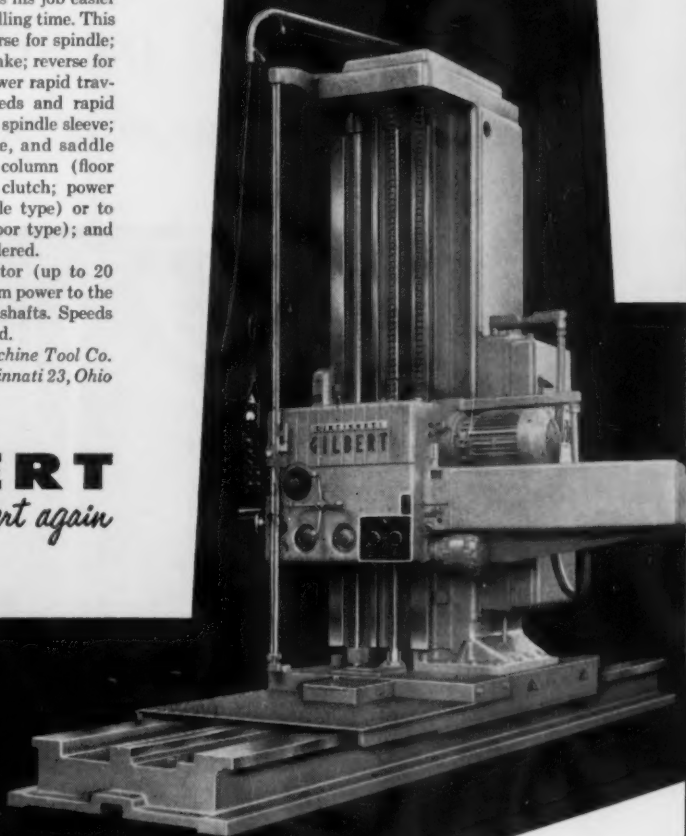
Every modern feature that can reduce floor-to-floor time is built into these new Gilbert 4" and 5" boring mills.

For one example, your operator can pre-select speeds and feeds, and power automatic shifting takes over from there. For another, the pushbutton station makes his job easier and reduces his machine-handling time. This controls start, stop, and reverse for spindle; spindle electric clutch and brake; reverse for all feeds; forward, reverse power rapid traverse; spindle and milling feeds and rapid traverse; back gear clutch on spindle sleeve; milling feeds to head, table, and saddle (table type), or head and column (floor type); spindle feed electric clutch; power clamp, head to column (table type) or to head and base-to-runway (floor type); and automatic positioning, if ordered.

The built-in reversible motor (up to 20 hp) on the head puts maximum power to the tool; there are no long drive shafts. Speeds up to 1,500 rpm are standard.

The Cincinnati Gilbert Machine Tool Co.  
3366 Beckman Street, Cincinnati 23, Ohio

*those who buy*  
**GILBERT**  
*buy Gilbert again*



# boring mills

For more data circle 388 on Reader Service Card

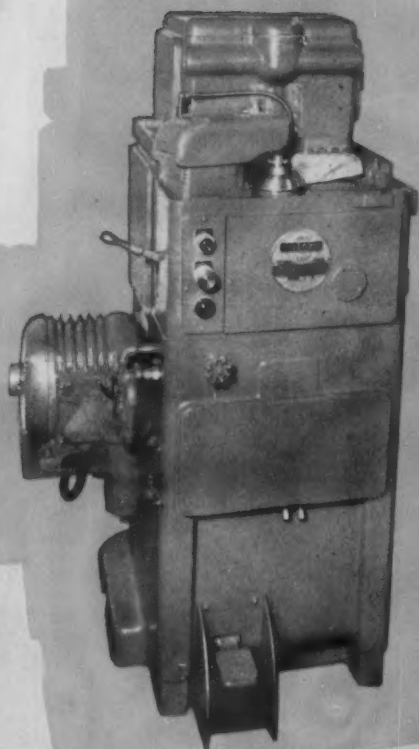
November, 1957

modern machine shop 83

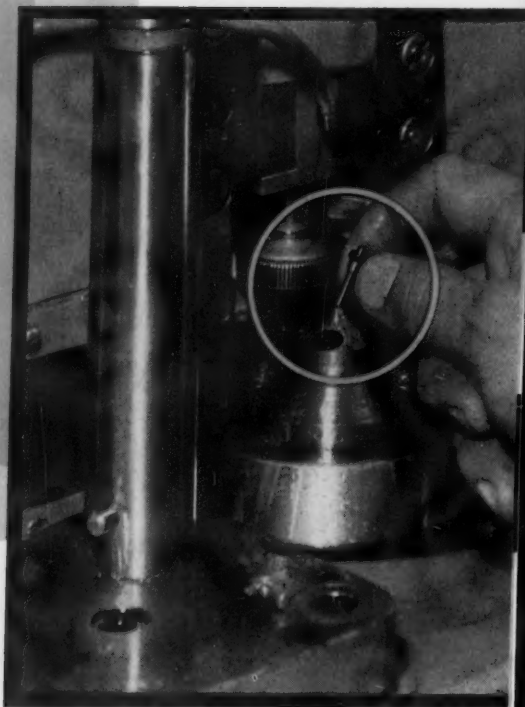
n Production Cost

# Lowers Pinion Pro fr

WITH FELLOWS INE



FELLOWS 3" FINE-PITCH  
GEAR SHAPER



*Speed and accuracy of the new 3" machine increased production of this pinion from 55 per hour to 120.*

THE  
PRECISION  
LINE



# on Production Cost from 16.9¢ to 6¢ each!

## WS FINE-PITCH PRODUCTION EQUIPMENT

Here's an example that shows how Fellows machines pay off in lowered gear production costs. This small pinion is manufactured for a major instrument maker on a Fellows 3" Fine-Pitch Gear Shaper.

Production is 120 pinions per hour, more than twice the production of previous machines. In addition, pieces are automatically deburred, eliminating an operation. *Result:* the cost per pinion is 10.9 cents lower than before!

Fellows 3" Fine-Pitch Gear Shaper cuts within close tolerances at speeds up to 2,000 strokes per minute. The Fellows No. 4 Fine-Pitch Red Liner inspection instrument gives chart-recorded, permanent proof of the accuracy of the product.

For full information about the Fellows Precision Line of gear production equipment — from 1/16" P.D. to 120" P.D. — contact your Fellows representative. Write, wire, or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY,  
78 River Street, Springfield, Vermont.

Branch Offices:

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150 West Pleasant Ave., Maywood, N. J.  
5835 West North Ave., Chicago 39  
6214 West Manchester Ave., Los Angeles 45

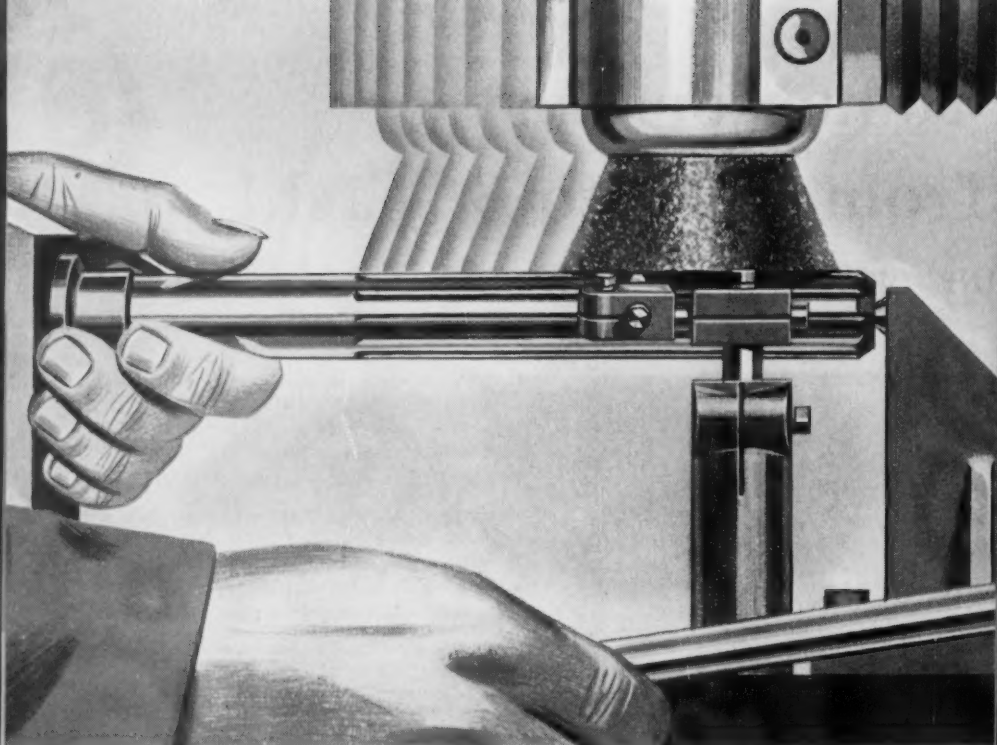


Fellows No. 4 Fine-Pitch Red Liner Inspection  
Instrument gives proof of accuracy.

# Fellows

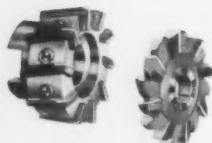
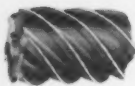
Gear Production Equipment

For more data circle 390 on Reader Service Card



## Oliver "ACE". Tool and Cutter Grinder

### WHEEL TRAVERSES... *not the work!*



Face mills, reamers, hobs, spot facers—all cutters straight or spiral—are quickly, easily and economically sharpened with the Oliver "Ace."

You can grind tools and cutters more accurately with the Oliver "ACE" because the wheel is brought *to the work*, reversing the usual process. Abrasive dirt and grit cannot cause wear because the cross carriage is not in motion. The horizontal ram which supports the grinding head moves in special bearings and is fully enclosed, sealed against dust and dirt. Further accuracy is assured because the wheel can be trued by a stationary diamond which provides a fixed grinding line. It is not necessary to reset the cutter to compensate for wheel wear.

The "ACE" is a universal tool grinder designed expressly for tool grinding—not a general purpose machine *adapted* to tool room work. It is simple to set up. All clearance angles are obtained by direct reading. Operators stand in a natural position with the control lever in easy reach and the work in direct view.

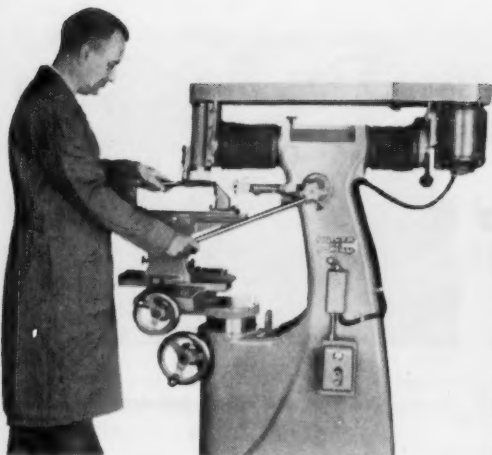
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UNUSUAL... 3 YEAR GUARANTEE

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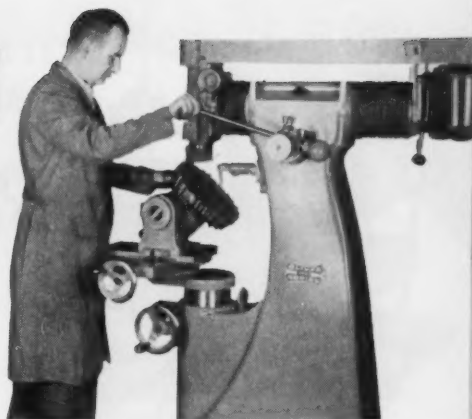
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1430



### OLIVER Standard "ACE"

This machine is for high speed and light duty carbide grinding. Only two fixtures are required to handle a complete range of tool and cutter sharpening. Clearance angles are obtained by tilting the grinding wheel the desired amount as indicated on a scale graduated in degrees.



### OLIVER Heavy-Duty "ACE"

... for grinding tungsten carbide cutters and tools in all of their many forms. Because it is for use with hard metals, all components have been designed with rugged going in mind. Like the standard "ACE," grinding is done on the top tooth, not on the side of the cutter. The operator has full vision at all times.

## More OLIVER of ADRIAN Tool Grinding Equipment



**FACE MILL GRINDER**

Completely automatic. A machine tool designed for accurate grinding. Wheel dressed with every stroke.



**TEMPLATE TOOL BIT GRINDER**

Controlled form grinding for high speed, stellite and tungsten carbide single point tools.



**No. 510 DRILL POINTER**

Semi-automatic. For drills  $\frac{1}{4}$ " to 3" in diameter. No. 21 bench models available for size  $\frac{1}{2}$ " and smaller.



**DRILL POINT THINNER**

For low cost reclaiming of drills. Corrects off-center and too-thick webs and out-of-index cutting edges.



**DIE MAKING MACHINE**

Produces dies, gages, cams, templates, stripper plates, etc. at greatly reduced costs. 5 designs in 2 types.

Just check the coupon for literature on the OLIVER of ADRIAN machine you are interested in. Send it today to...



**OLIVER of ADRIAN**

**OLIVER INSTRUMENT COMPANY**

1430 E. Maumee St. • Adrian, Michigan

- ☐ Drill Pointer
- ☐ Face Mill Grinder
- ☐ "Ace" Universal Tool and Cutter Grinder

- ☐ Die Making Machine
- ☐ Drill Point Thinner
- ☐ Template Tool Bit Grinder

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

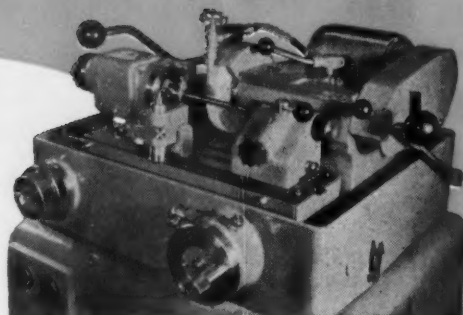
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**These Rubber-Cushioned,  
MULTI-USE STOCK ABRASIVES**

UNUSUAL . . . 3 YEAR GUARANTEE



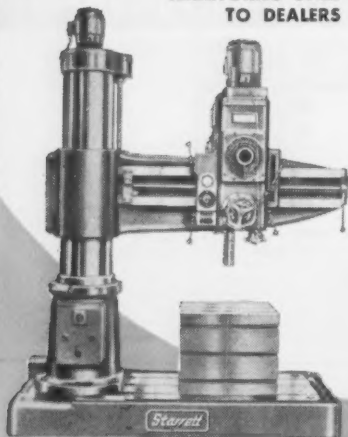
**HAAS**  
UNIVERSAL TOOL & CUTTER GRINDER  
**\$1,195.**



**OVERBECK**  
Precision Cylindrical Grinders  
**\$3,295.**

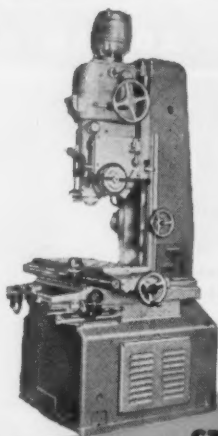
**OUTSTANDING NEW  
MACHINERY...  
BEST VALUES IN THE U. S. A.**

A FEW EXCLUSIVE  
TERRITORIES STILL OPEN  
TO DEALERS

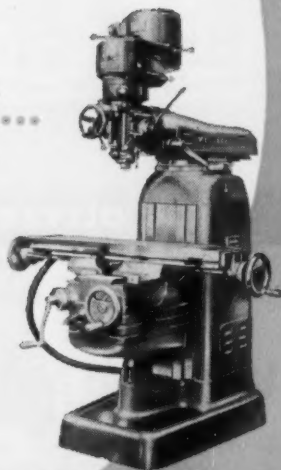


**STARRETT**  
Radial Drills  
Sizes 2 1/2' to 6'  
**\$1995. to \$6985.**  
LIBERAL TERMS • RENTALS

See Page 81



**STARRETT** Optical Jig Borer  
**\$9,950.**



**WESTBURY 1S**  
Vertical Turret  
Milling Machine  
**\$2,095.**

**AARON MACHINERY CO., Inc.**

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# These Rubber-Cushioned, MULTI-USE STOCK ABRASIVES DO THE WORK OF SPECIALS....

## GIVE A COMPLETELY NEW, WIDER CONCEPT OF ABRASIVE APPLICATIONS

*Brightboy brings you something definitely different! A unique working action noteworthy for newness and versatility. Frequently reduces BURRING, FINISHING, CLEANING, POLISHING, to a single-step operation.*

*Special formulation is responsible for Brightboy's exceptional adaptability. Abrasive grains and "cushioning" rubber are evenly dispersed throughout the compound. Abrasive and rubber work simultaneously.*

STOCK NUMBERS, job matched to your regular and special requirements. Silicon Carbide and Aluminum Oxide grains, each from extra fine to extra coarse, in soft, firm and tough rubber binders.

Ask your dealer for Brightboy recommendations and for the Brightboy Catalog listing grains, textures, machine speeds, work suggestions. Write us if he cannot supply you or on any problem in which finishing is involved.

**BRIGHTBOY INDUSTRIAL DIVISION  
WELDON ROBERTS RUBBER CO.**

95 North 13th Street • Newark 7, N. J.

*America's Pioneer Manufacturer of  
Rubber-Bonded Abrasives*



### TIME-SAVING FEATURES

- Works to close tolerances
- Can be shaped to contour
- Produces conventional and special finishes and patterns, frequently the final polish
- No before-use preparation or dressing
- No skilled labor required

### GENERAL USES

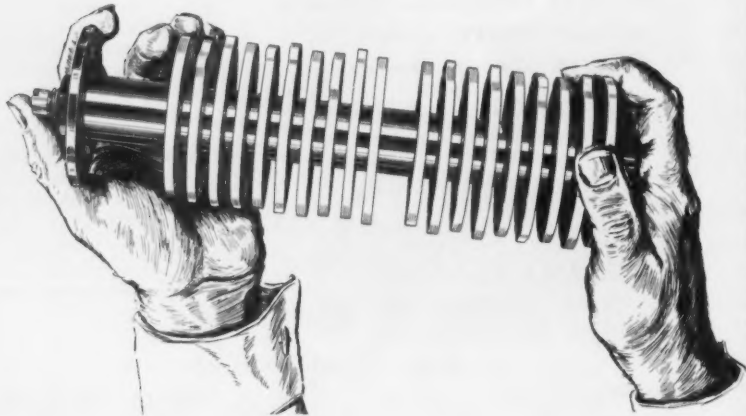
- Removing light digs, tool and heat marks
- Cleaning welded and soldered joints
- Burring and finishing castings, stampings, machined and molded parts
- Maintenance of tools and machinery

For more data circle 394 on Reader Service Card

November, 1957

modern machine shop 89

# He's holding an automatic cycle



Multi-cycle programmer is the name. And it's only one of many built-in features which make the Monarch Model 21 Mona-Matic the most productive automatic cycle lathe available today.

You can use the Model 21 for a hundred or a million parts. The programmer method cuts setup time to such an extent that switching over from one part to another is accomplished just about as quickly as job change on an engine lathe.

The Model 21 has all the power needed to utilize the full productivity of carbide tooling; has the speed to fully realize the economies inherent in ceramic tooling.

This machine may be used with

equal efficiency on one, two, three or four cut cycle work while the switch from one cycle to another is accomplished in most cases by doing nothing more than changing multi-cycle programmer and making a few quick readjustments.

Get all the benefits of the time-proved "Air-Gage Tracer"—the most accurate lathe duplicating device known. It's so fast in operation that the only limitation in cycle speed is imposed by what the tool will stand.

When you buy a production lathe, RESULTS are what you want. That's what you get in the Model 21. Booklet 1808, yours for the asking, tells why in detail... **The Monarch Machine Tool Co., Sidney, Ohio.**

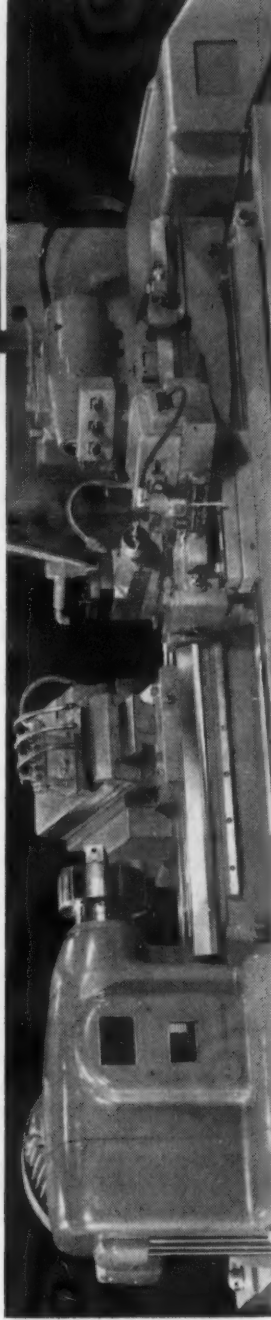
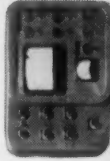
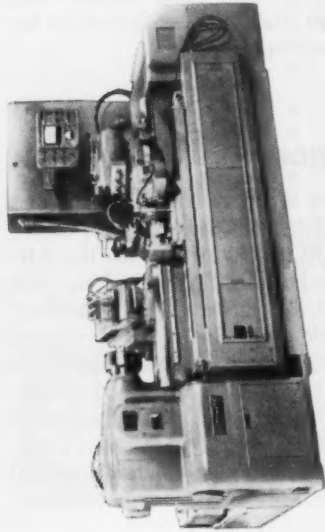
- Exclusive automatic feed change with up to six different feeds, each of which is infinitely variable and each of which may be made operative at any time during the cycle.
- All feeds adjustable under cut. This often lengthens tool life and thereby increases day in and day out productivity.

- "Air-Gage Tracer" utilizes the combination of air-hydraulic control with a stylus pressure of only five to six ounces against the template. There is no appreciable template wear; accuracy



• All feeds adjustable under cut. 1 min. often lengthens tool life and thereby increases day in and day out productivity.

- "Air-Gage Tracer" utilizes the combination of air-hydraulic control with a stylus pressure of only five to six ounces against the template. There is no appreciable template wear; accuracy of template shape reproduction is within  $\pm .001$ " on most jobs.
- All way surfaces flame hardened and ground. The accuracy built in is retained year after year.
- Work piece change speeded by a single multiple position lever on tailstock. In proper sequence it controls both the tailstock center and the air operated chuck.
- Rugged rear carriage for auxiliary machining operations, timed to take its cut at any point during the cycle.
- Automatic lubrication; from end to end, all the time.



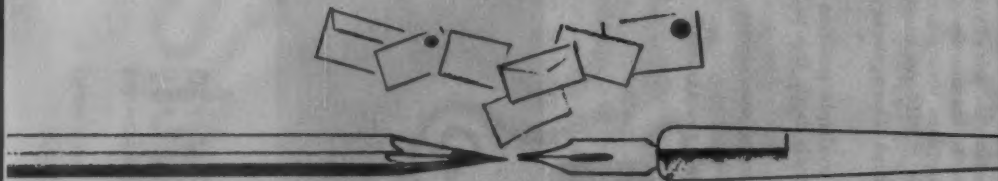
### **Flexibility Unlimited**

With such optional equipment as (1) inbuilt constant surface cutting speed, (2) automatic indexing two-position tool holder, (3) power chip conveyor and (4) chip and coolant guard.

# **Monarch**

TURNING MACHINES

FOR A BETTER TURN FASTER... TURN TO MONARCH



## TOMORROW'S MARKETS

The more than 400 members and guests of the American Machine Tool Distributors' Association who attended the recent annual meeting in Cleveland, heard the principal speakers at the meeting make two important predictions: one, greater use of machine tools as the key to greater productivity, and two, stiffer competition from European machine tool builders. They also expressed confidence that the general trend of gross national product will continue to follow the economic growth of the last ten years.

Joseph F. Owens, Jr., retiring president of the association urged recognition of the changes taking place on the American scene, and the important part that the machine tool industry plays in them. He cited as examples the trend toward greater employment in the service industries rather than in the direct production of goods and the steady shortening of the average work week.

According to Mr. Owens, the only way our national needs can be met is through greater use of more and better machine tools. In them we have the direct key to increased

productivity in manufacturing, and, through production of more and better farm machinery, construction machinery and mining equipment, the indirect key to increases in these fields. Young people will be given more time for education, old people more time for retirement, and the population as a whole more time for recreation and leisure.

Mr. Owens concluded his remarks by saying that the industry will undoubtedly have its ups and downs of a short term nature—but long term, the trend is favorable toward good business.

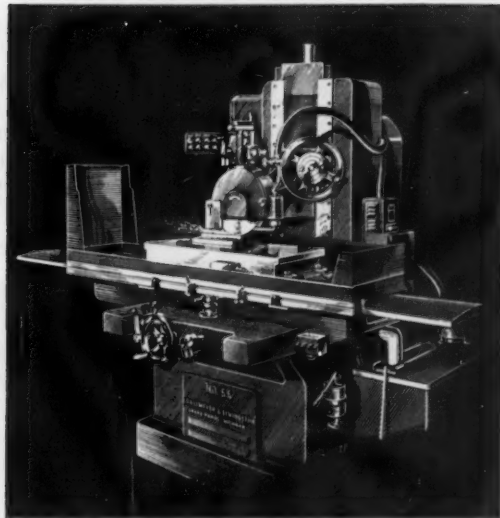
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## PREDICTION

During a symposium sponsored by the Electronic Industries Association, in cooperation with the Aircraft Industries Association, the National Machine Tool Builders' Association, the National Electrical Manufacturers Association, and the National Association of Manufacturers, Ralph E. Cross, Executive Vice President, The Cross Company, and Director of the National Machine Tool Builders' Association



tools of tomorrow. He concluded his remarks by saying that today, the machine tool industry is stronger, younger minded and better pre-



## Questions you should ask before you buy a **SURFACE GRINDER**

- Are column and base *one piece* for permanent vibrationless rigidity?
- Are both longitudinal table travel and cross feed hydraulically actuated?
- Is wheel head powered for rapid vertical travel?
- Is it equipped with Vickers vane hydraulic pump?
- Is longitudinal table capable of speeds to 125 fpm?
- Is it equipped with greased-for-life, pre-loaded ball bearing spindle?
- Does wheel head have 18 inch vertical movement?
- Is the spindle capable of speeds of 1925 and 2500 rpm?
- Does it have a 12" x 36" table working surface?
- Is it equipped with Bijur one-shot lubricating system?

**You'll Choose Grand Rapids Grinder, No. 55** because it's the only grinder of its type that answers an emphatic "yes" to every one of these ten important questions.

Write for 24 page book  
that tells all about it.



**GALLMEYER & LIVINGSTON COMPANY**

408 Straight Ave., S.W., Grand Rapids, Michigan

November, 1957

modern machine shop 93

# BUY Precision **THAT FITS...!**



made the prediction that in the next five years new numerically controlled machine tools will obsolete many of the machine tools that are now considered to be highly profitable investments.

Mr. Cross stated that the Air Force has purchased over 100 numerically controlled machines for air frame production. These machines, which are scheduled to go into operation between now and 1959, are accelerating the introduction of other numerically controlled machine tools. They will not necessarily be machines of the type used by big business for mass production. More likely they will be the machines used by thousands of small plants throughout the country.

Rough estimates from authoritative sources show that there is a total of 1,700,000 machine tools in use today which could be improved by the use of numerical control. As to the outlook for machine tools, Mr. Cross stated that he believed there is altogether too much talk today about economic ceilings, surplus productive capacity and a leveling out in the demand for machine tools. Further, he feels that economic forecasters continually underestimate the creative power of our scientists and engineers. In his opinion, whether we are going to bump our heads on an economic ceiling or break through to an era of greater prosperity will depend, in large measure, on the machine

tools of tomorrow. He concluded his remarks by saying that today, the machine tool industry is stronger, younger minded and better prepared to contribute its share to the growth of America than at any time in its history.

★ ★ ★

## SENSITIVE MEASUREMENT

Measuring metal in solutions a thousand times more dilute than those analyzed previously can be done with a rapid method which has been developed at the University of Wisconsin. It is an electrolytic method which is said to measure one part of lead in five trillion parts of solution. It is so sensitive that lead absorbed into solution from the glass walls of a container will upset readings.

★ ★ ★

## CERAMIC TOOL FACTS

From a recent issue of Blue Chips, a publication distributed by Warner & Swasey, we borrowed the following concise list of facts about cutting metal with ceramic tools:

1. Clamp-on type holders for "throw-away" cutter tips should be used.
2. Generally speaking, iron and steel can be machined in this range:  
     400 — 1000 SFM  
     .004 — .020" Feed  
     .010 — .375" Depth of Cut
3. The workpiece, machine tool, toolholder post and toolholder

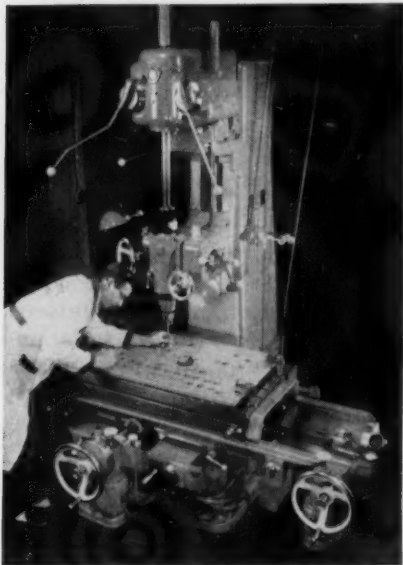


# BUY Precision THAT FITS...!

for tenths  
**YOU NEED A  
CLEEREMAN JIG BORER**

**OR**

for .001"/foot  
**YOU NEED A  
LAYOUT DRILLING MACHINE**



If your work involves gages, jigs, fixtures, or "jigless" production with ultra-fine tolerances, one of the three models of Cleereman Jig Borers is the answer.



But when your work calls for tolerances of .001" per foot, the economy of the Layout Drilling Machine is the "common sense" approach to your problem.

There are installations near you. Your Cleereman distributor can answer your questions and arrange an inspection visit for you.



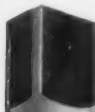
**CLEEREMAN MACHINE TOOL CORP.**  
GREEN BAY, WISCONSIN

For more data circle 395 on Reader Service Card

November, 1957

modern machine shop 95

*...and in taps*





must be as rigid and vibrationless as possible.

4. A loose curled chip is best — often requiring an adjustable type mechanical chip breaker to produce.
5. Use of ceramics requires special care—each job should be studied to get the best cutter tip geometry.
6. No interrupted cuts yet.
7. Rough, out-of-round work surfaces or surfaces with heavy scale are not practical for ceramic applications.
8. Work finishes are very good.
9. Coolants not necessary but can be used.
10. Quality and metal-cutting ability of ceramic tips are not yet entirely reliable from one tip to another.
11. Tool life is very good for ceramic tips on the proper job. As with other cutting materials, tool life goes down as speed goes up.
12. Very slow speeds (below 400 SFM) are especially hard on tool life — so are ultra-high speeds (perhaps above 2000 SFM).
13. The less shock the better at entry of tip into work — careful feeding-in and good lead angles will help.
14. Heavy cuts (.375" depth) are best taken with lighter feeds to spread the load on tool face.

## YOU ARE IMPORTANT

When you are tempted to take a day off without notifying your boss, and you think that the absence of one person won't make too much difference, you place your boss in the same position as a fellow trying to type with one key missing. He can make substitutions just as we have done here, but the result is never the same as when his working with the right people on the right job.

★ ★ ★

## MOST OF OPPORTUNITY

Speaking at the presentation of the 1958 line of Chrysler cars last month, Mr. L. L. Colbert, president of Chrysler Corporation, expressed confidentially that present inflationary trends can be curbed by means of positive, practical counter measures. The following brief quotation from his remarks reveals the extent to which, he feels, industry must extend itself in the attempt to overcome the tendency toward inflation.

"In recent months every thinking American has been concerned with the problem of inflation. Beneath the surface of all the proposals and counter-proposals for curbing the strong inflationary trend of the past two years there is the fear that unless we find some way of controlling the rise in costs and prices we may mortgage the future and rob ourselves of the golden opportunity that lies ahead. The threat of continued inflation is a shadow across the face of what is potentially a very bright future.

"Every thoughtful person knows



This means plowing back profits. It sometimes means borrowing funds in the money market. It always means planning ahead to



*...and in taps*



*CARD is*

*ACES with OPERATORS*

Operators busy at many different tapping applications will tell you that Card taps can be depended upon for precision performance and long life — on job after job. And shopmen are sure of getting uniform top quality in gages as well as taps, every time they use these popular Card tools. S. W. CARD DIVISION, Mansfield, Mass. Card Warehouses: Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York, San Francisco.

# CARD

DIVISION OF UNION TWIST DRILL COMPANY

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## NEW IDEA!



there are no quick and pat solutions to the problem of inflation. It is started and sustained by many forces and factors and every group that makes a contribution to the economy has its own unique responsibility in helping to curb inflation. In our free society each group must determine for itself how it can best discharge that responsibility.

"One of the conditions contributing to the pressure of inflation is the lack of balance between the size of the total population and the size of the working force. The Census Bureau has said that in the decade ending in 1965 our total population will increase by more than 15 percent while the population of working age will increase by only a little more than half as much. Or consider this fact. Between 1955 and 1965 the number of people between 25 and 44 will actually *decrease* while the population as a whole is increasing by 28 million. The population is growing fast at both ends and shrinking in the middle; and it will be at least seven years before this condition begins to correct itself. In the meantime, proportionately fewer people will have to produce more efficiently to provide more goods and services for many more people.

"This being the case, one of the greatest contributions that can be made by key industries toward the slowing down of inflation is to invest in more efficient tools of production.

This means plowing back profits. It sometimes means borrowing funds in the money market. It always means planning ahead to match future needs with future facilities. At Chrysler Corporation, for instance, we are investing approximately \$130 million during 1957 in plants and equipment—exclusive of special tooling—to help increase productive efficiency and to supply capacity in line with the anticipated size of the future market for our products. And as it looks right now, we expect to be investing about the same next year.

"The current variety of inflation seems to differ in some ways from any we have known in the past, but it is still true that the fundamental way to curb inflation is to increase the efficiency with which the country's needs for goods and services can be supplied. And since any company, if it is to prosper, must—among other things—invest wisely and systematically in more efficient production, it also, in so doing, serves the interests of the nation."

★ ★ ★

#### **AUTOMATION TO MEET REAL NEED**

The automatic post office may be a reality next year according to the National Bureau of Standards. The Bureau is developing prototypes of machines for sorting first-class mail. A memory system under development will memorize the distribution scheme of a city and then be able to look up any address in the largest city in 1/20th of a second.



miles per hour. Leo D. Welch, vice-president of the Standard Oil Company of New Jersey sees U. S. an-

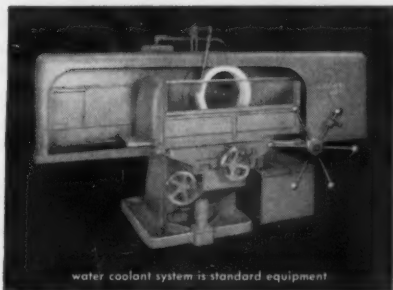
# NEW IDEA!



## why MACHINE it off—when you can GRIND it?

Stock really comes off with an Abrasive 18" Face Grinder. Sixty-five thousandths of an inch at a pass! A rugged 15 H.P. motorized Abrasive spindle turns the wheel at 900 R.P.M. Surface speed is 4500 feet per minute. 24" table travel, plus 18" wheel gives big work capacity.

Time is money! Machining flat surfaces wastes both! Grind it off faster, with better surface finishes, with an Abrasive 18" Face Grinder just as leading metalworking plants—those really making money—are grinding forgings, castings and dies.



water coolant system is standard equipment

**TYPICAL APPLICATIONS** ■ Castings . . . eliminates milling or planing . . . requires less stock to be left on for finishing . . . as much as  $\frac{3}{4}$ " of stock can be saved on each surface. □ Automobile Body Dies. ■ Plastics Molding Dies. ■ Molded Insulating Fire Brick. ■ Ceramic Insulators. ■ All types of Forging Dies. ■ WHEREVER FLAT, SQUARE SURFACES ARE REQUIRED.



Complete, detailed, fully-illustrated Catalog is yours free. Write for it.

**ABRASIVE**  
MACHINE TOOL COMPANY  
EAST PROVIDENCE, RHODE ISLAND

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### CREATIVE RESEARCH

Under the guidance of Hans Ernst, Director of Research for The Cincinnati Milling Machine Company, hundreds of production executives from metalworking plants across the country were given the opportunity last month to view first hand the entire scope of research and development work in which the company is presently engaged. This work extends over the widest possible range, involving the design, building and application of the latest in metal cutting tools and materials. On Page 142, we have included abstracts of papers presented by The Cincinnati Milling Machine Company personnel at the Technical Activities Seminar. These abstracts are informative and well worth the time it will take you to read them.

★ ★ ★

### YEARS FROM NOW

Lately there have been numerous long range business predictions, none of them colored with the uncertainty attached by many to the short range. Recently, for example, many ranking business leaders jotted down some forecasts about the world of 1979. President C. R. Smith of American Airlines predicted that commercial airliners of that year will be traveling at 1,000

miles per hour. Leo D. Welch, vice-president of the Standard Oil Company of New Jersey sees U. S. annual output of goods and services possibly topping \$900 billion—more than double the present level. President Keith Funston of the New York Stock Exchange has predicted that 1979 may find between 15 and 20 million persons owning stock, compared with 8.6 million today.

★ ★ ★

### NATIONAL METAL CONGRESS

Eyes of the nation and the world will be focused on Chicago's International Amphitheatre during the week of November 4 to view the activities of the 39th Annual National Metal Exposition and Congress. Metals industry men will not only be "eyeing" Chicago but many of them will be there to witness this outstanding annual event.

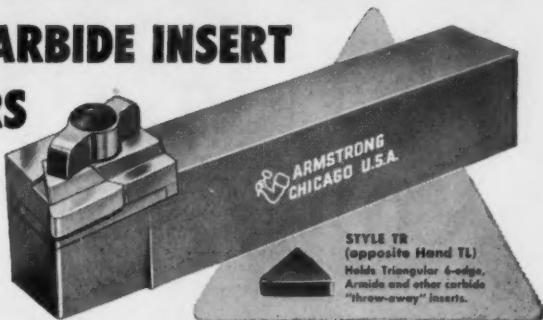
Highlighting interest in the Chicago Show will be the presence of more than 500 international metal scientists, World Metallurgical Congress conferees. An additional attraction will be an exhibit sponsored by the U. S. Atomic Energy Commission. Nearly five hundred separate exhibits are scheduled for the Amphitheatre. The Congress and Exposition this year promises to be the largest and best ever held under the sponsorship of the American Society for Metals. Anyone who takes the time to attend this meeting and show will be richly rewarded with ideas for helping him to do his job in the metalworking field just a little bit better than it had ever been done before.



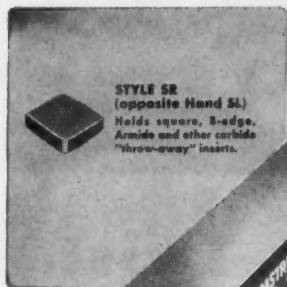
*New*

# ARMSTRONG

## *Armide* CARBIDE INSERT TOOL HOLDERS



STYLE TR  
(opposite Hand TL)  
Holds Triangular 6-edge,  
Armide and other carbide  
"throw-away" inserts.



STYLE SR  
(opposite Hand SL)  
Holds square, 8-edge,  
Armide and other carbide  
"throw-away" inserts.



Write for  
catalog

**Embody... Convenience, Economy  
Simplicity and Strength  
based on these superior features:**

- IMPROVED CLAMPING METHOD — speeds indexing of inserts.
- REPLACEABLE SEAT of Hardened Tool Steel — protects shank and provides flat base to prevent damage to inserts as they are clamped in position.
- SHANK of Heat Treated Alloy Steel — gives extra strength and rigidity.

A slight turn of a single screw permits rapid indexing of the ARMIDE insert—reducing down time to a minimum.

The use of ARMIDE "throw away" inserts provides the economy of multi-edged inserts—triangular inserts have six, square inserts eight cutting edges. These are available in Utility or Precision finish and in three grades of ARMIDE: 350, 370 or 883.

Protection to the shank is given by the replaceable tool steel seat which prevents wear and damage to the shank and provides a flat base for the insert reducing the possibility of damage to the insert as it is clamped in place. A relief groove is ground into the seat providing clearance when a dulled insert with "built up" edges is turned over.

ARMSTRONG ARMIDE Carbide Insert Tool Holders are furnished in two styles and three sizes. Complete data on these tools is given in Bulletin CIT, mailed on request.

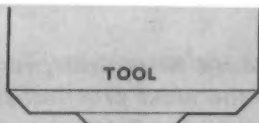
**ARMSTRONG BROS. TOOL CO.**  
"The Tool Holder People"

5228 W. Armstrong Avenue, Chicago 30, Ill.

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November, 1957

modern machine shop 101





## Relief Grinding Twist Drills for Spotfacing

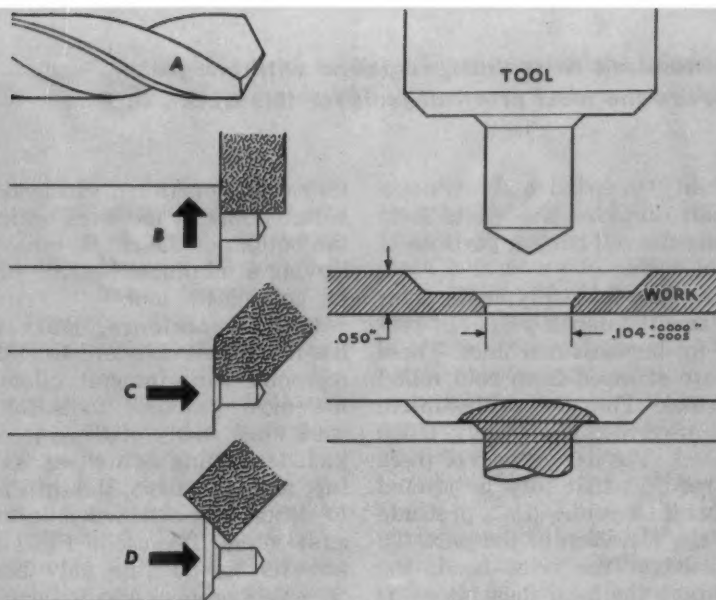
***Business machine manufacturer utilizes universal form relieving fixture and grinder to grind standard twist drills with integral pilots for spotfacing stamped parts.***

By IRA S. ROBERTS

**A program recently instituted** by Royal Oak Tool & Machine Company, Royal Oak, Michigan, manufacturer of the R-O universal form relieving fixture and grinder,

involves field studies into the various applications which users have found for this equipment other than standard tool sharpening operations. This report deals with a field





At the left, operator is shown roughing step into twist drill so as to produce a pilot. Tool is held in bushing supported by steady rest. In the sketch above, drawings (A), (B), (C)

and (D) indicate manner in which standard twist drill (A) is ground. Diagram at the right shows ground tool and how the work is cut for the recessing of the rivet head.

study at the Burroughs Adding Machine Company's Plymouth, Michigan plant. A conference was held there with Mr. John Miller, general foreman of the toolmaking department, Mr. Hugh Gascon, engineer, and Mr. Russel Creel, community relations supervisor. A discussion of the work performed on the R-O universal form relieving fixture and grinder by this large business machine manufacturer revealed that one of the features which the manufacturer of the equipment had always stressed as important — relief of intersecting blades such as spotface and chamfer without undercutting at the point of intersection, or relief of an

end cutting blade without undercutting the adjacent pilot — had added importance in certain types of operations.

Such multiple operations as the first mentioned above were ordinarily performed at Burroughs singly as two operations or with a subland type tool in one operation. The result of doing the job by either method with one cut following the other was the formation of a burr on the work at the intersecting or overlapping point. While the R-O method of grinding eliminated the burr, which was an important advantage to Burroughs, this was found to be only secondary in importance to the benefit derived from

***"... standard twist drills, reground with integral pilots, are the most practical tools for this work . . ."***

the ability to grind and maintain the pilot diameter size while form relieving the end cutting portions of the tool.

At the Burroughs Plymouth plant many small stamped parts are produced for business machines. These parts are stamped from cold rolled strip stock. The pieces illustrated, which are typical, are only 0.050 inch thick. The use of some of these parts requires that they be riveted and that the rivet head not protrude above the elevation of the part. To accommodate the rivet head, the area where the head must recess is spotfaced. This being high production work, it is not practical to bushing guide the cutter that per-

forms the operation. Instead, the cutter pilots in the work which, at the bottom of the cut, is quite thin, leaving a minimum bearing surface for guiding the tool.

**From experience,** Burroughs has found that standard twist drills, reground with integral pilots, are the most practical tools for this work since many of these jobs also include drilling as well as spotfacing; and, on others, the drill serves to deburr the stamped hole to size as it enters. The use of these drills, however, is possible only because they can be reground without producing an undercut at the intersection of end cutting blade and pilot. With an undercut, the tool would



*For producing countersinking tools, large wheel is used. Pilot and countersinking blades can be finished in one operation.*



*Internal attachment is swung 90 degrees for relief of end cutting spotfacing blades. Pilot is finish ground in this operation.*

***"... drills may be easily repositioned after removal for checking or repositioned for subsequent grinding operations."***

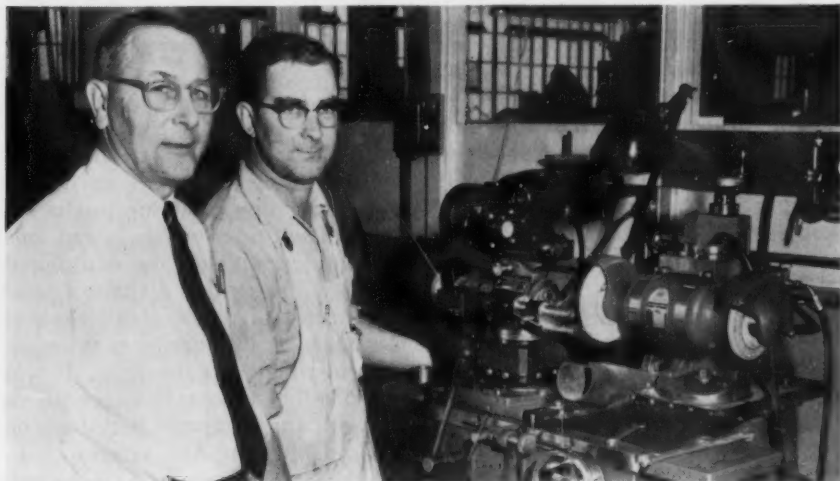
**"The problem of forming flat faces on the blades . . .  
is easily overcome by the use of small diameter wheels."**

not pilot in the thin stock, but, with the pilot ground undersize, the tool would be free to operate off center. Accordingly, the tool is ground in an R-O type fixture to preserve the pilot diameter with subsequent re-sharpenings of the intersecting blade.

Before the company had its own R-O fixture and grinder, Burroughs sent this tool grinding work outside. This involved a delay of from two to four days which the company could not afford. The comment of the personnel was to the effect that now with their own R-O fixture and grinder in their own tool grinding department, they could not get along without it for reasons of con-

venience alone. They now have the tools when they need them to keep production going, which is of utmost importance to them.

**The problem of forming flat faces** on the blades and a relatively sharp corner at the intersection of the blades and pilot is easily overcome by the use of small diameter wheels. Burroughs uses a high speed (45,000 r.p.m.) R-O internal grinding attachment with a small wheel. This attachment mounts on the back of the grinder column. The installation of the attachment in no way interferes with conventional use of the regular spindle and larger grinding wheels for use in the grinding of other work.



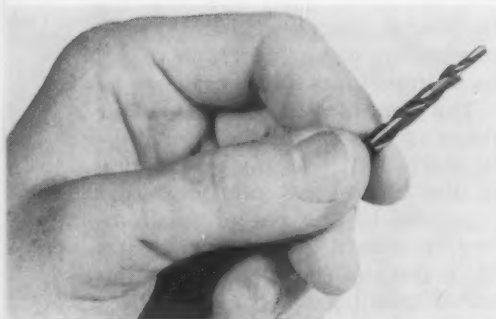
**This illustration shows (at the left) John Miller, general foreman of the toolmaking department of Burroughs Adding Machine**

**Company's Plymouth, Michigan plant, together with Bill Kangas, operator of the universal form relieving fixture and grinder shown.**

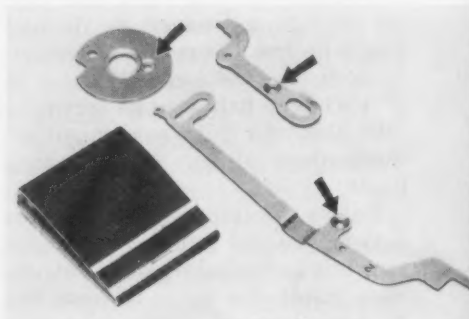
modern and immaculate with proper dust control and lighting. The operators take extreme pride in

ture applications and has sponsored many contracts for research and development of such materials

**"... drills may be easily repositioned after removal for checking or repositioned for subsequent grinding operations."**



*Illustration showing standard 3/6-inch twist drill which has been relief ground with integral pilot for spotfacing operations.*



*Typical stamped business machine parts which are relieved with a spotfacing tool of the type shown in the adjacent illustration.*

In the application described here, the column is swung around 90 degrees and the fixture is set for axial motion only into the wheel, producing end relief of the spotfacing blades and finish grinding the pilot to size without relieving it. Burroughs also utilizes the standard guide bars and center bracket of the fixture with a standard A.S.A. drill bushing inserted in order to obtain complete rigidity of the small diameter tool (under 11/32 inch) while grinding same.

**Larger tools are supported** in a standard R-O steady rest which accommodates bushings for drills 7/32 to 1 7/8 inches. This method virtually eliminates the problem of chucking trueness and assures concentricity of pilot diameter to the body of the drill since the pilot diameter is generated from the body of the drill supported in its bush-

ing. An added advantage reflected in this particular method is that the drills may be easily repositioned after removal for checking or repositioned for subsequent grinding operations.

When Burroughs went outside for this work, the cost as compared with doing it themselves on their own equipment was about 3 to 1. The wheel and time cost for producing the subject tool, which is but one of many ground on the equipment is \$1.43. The drill is \$.42 for a total initial cost of \$1.85. Regrinds cost less than \$1.43 since it is unnecessary to rough out the pilot. It was not possible to obtain exact prices on work the company had done on the outside, but Mr. Gascon indicated it ran as high as \$6.00, including the drill.

The Burroughs toolmaking department is a model operation;

modern and immaculate with proper dust control and lighting. The operators take extreme pride in their work and give their machines every attention.

★ ★ ★

**Ductile Chromium.** A Review of World Progress on Ductile Chromium. By 49 authorities. 376 pages. Cloth binding. 220 graphs, charts and tables. 310 literature references. Available from Technical and Engineering Book Service, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. Price, \$7.50.

Entirely new fields of usefulness for chromium and its alloys are forecast by the findings reported by 49 authorities in this new book. This illustrated volume presents the proceedings of the important 1955 Conference on Ductile Chromium, co-sponsored by the Office of Ordnance Research, U. S. Army, and the American Society for Metals.

Here is a factual account of the significant work on the extraction, fabrication and properties of a metal that is a most promising base for new alloys of superior oxidation resistance and strength at elevated temperatures. More than twenty years of intensive research in the United States, Europe and Australia have been devoted to the development of chromium base alloys for high temperature service.

Industry has wide use for chromium, with more than a million tons of chromite ore consumed annually in the United States. Since World War II, the Department of Defense has been interested in chromium base alloys for high tempera-

ture applications and has sponsored many contracts for research and development of such materials.

This book provides the research findings reported by the representatives of such outstanding organizations as Aeronautical Research Laboratories of the Commonwealth of Australia, Battelle Memorial Institute, British Steel Castings Research Association, California Institute of Technology, Electro Metallurgical Co., General Electric Research Laboratory, Horizons, Inc., Massachusetts Institute of Technology, National Bureau of Standards, Office of Naval Research, Rensselaer Polytechnic Institute, U. S. Bureau of Mines, U. S. Department of the Interior and Watertown Arsenal.

This 376 page book includes a 14 page name and subject index and is packed with 220 charts, tables and photomicrographs. Exceedingly helpful are the 310 literature references presented immediately after each of the chapter conclusions.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



"He said that if I brought him one more change in specifications he'd do it—but I thought that he was just kidding me."

quite a bit of disaffection, not only among his brother executives, but with the supervisors reporting to

nal success with the chemical corporation. This man was an executive first and foremost. He knew



## THAT **BIG** STEP FROM SUPERVISOR TO EXECUTIVE

***This transition point, according to the author, is becoming increasingly important as our industries continue to expand and top-flight executive material becomes more difficult to obtain.***

By **ALFRED M. COOPER**  
Contributing Editor

**As a rule, the management of any corporation** prefers to select its top-flight executives from the ranks of its present supervisory force. The reason is simple: These supervisors are men who have served their company loyally for a period of perhaps 20 years. They have become familiar with every facet of company policy and routine as it relates to a hundred-odd matters. They have a fair knowledge of the existing management personnel, and the degree to which this personnel differs from that of other companies.

Thus, a supervisor who has been made an executive in his own company (and this is a tremendous, clearly defined step forward for him) will never be heard to say, "Now, this is not the way we did things over at the Blank Corporation." Of course it is not, but it may require years for an important executive, however intelligent and well-grounded in the fundamentals of his job, to understand *why* things are done differently in the new plant. During this period of orientation such a new executive can create

***"Above the rank of division head or superintendent the line of promotion is more clearly defined."***



quite a bit of disaffection, not only among his brother executives, but with the supervisors reporting to him, and even among members of the work force. Any of these may feel either that the new chief is away off the beam, or that their own organization is behind times in many important respects. Either reaction can cause a lot of trouble.

There are, of course, exceptions to this rule, and these should be noted here. *I have known of many executives in my time who could change over from one company to another and never even turn a hair.* These men were executives first and engineers or scientists secondarily. Such men appreciate that their real job now is *administration*; that their earlier training in a trade or profession has little bearing on their success as an executive.

Thus, I once knew a man who was general manager of an electric power company in Illinois. Somehow the management of one of the greatest of our chemical corporations discovered that this fellow was a marvelous executive. After investigation, they offered him a job as general manager of one of their largest plants, *at twice his salary as a utility executive.*

**The general manager protested** that he knew *nothing* of chemical manufacture; he was told they were not employing him in that capacity; that they had plenty of men who knew everything about that subject. What they would be paying for was his proven ability as an *administrator*. After much consideration he took the job, and it was no surprise to those of us who knew him best that he made a phenome-

nal success with the chemical corporation. This man was an *executive*, first and foremost. He knew how to utilize and direct the knowledge of subordinate executives — even when this knowledge was completely beyond his ken.

In another instance I listened to a talk given by the branch superintendent in the greatest telephone manufacturing plant in the world. This man had earlier been a chemist in that plant (in that plant "branch" referred to a group of divisions; the branch superintendent had approximately 8,000 chemists, physicists, metallurgists, et cetera, reporting to him). In this informal address, the superintendent began frankly by stating that he had forgotten most of the chemistry he had known; that his present job was *dealing with human-factor problems* presented by the thousands of chemists, physicists, and various individuals who now reported to him.



"... management of any corporation prefers to select top-flight executives from the ranks of its present supervisory force."

**"Above the rank of division head or superintendent the line of promotion is more clearly defined."**

Both of the aforementioned executives had long ago learned that administration is a profession in no way related to the type of work performed by the artisans under their direction. *Each individual also knew that there is a vast difference between the work of a supervisor and that of an executive.*

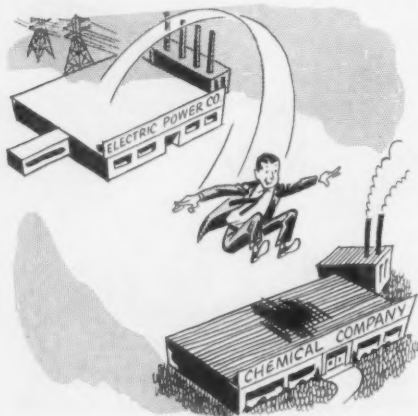
**In order to discuss intelligently the transition** from supervisor to an executive, it is well to utilize a more or less standard terminology. Thus, in most industrial organizations, a foreman is definitely a supervisor and probably a very good one. But he is definitely *not* an executive. In many of our largest metalworking plants (employing 50,000 or more people) the line of promotion is somewhat as follows: from artisan to straw boss, then

probably on to an assistant foreman or assistant office manager; thereafter to a full-fledged foreman or office manager. This man, while still a supervisor, continues to be a supervisor even though he may have as many as 500 people reporting to him. A good example of this might be the foreman of a large punch press department.

Later this foreman, if he has what it takes, is made general foreman, with a number of foremen reporting to him (perhaps the foremen of a half dozen punch press departments). This general foreman has enormous responsibility, and much of the success of the company may depend upon his efforts. But he may, in instances, still continue in the ranks of the supervisors.

Thereafter, the logical line of promotion in such a large plant is to the job of superintendent or division head, with perhaps a number of general foremen reporting to him. *Now he has definitely reached executive rank.* Or, the jump may be from foreman or department head to division head or superintendent, in which case this constitutes the line of demarcation between supervisor and executive.

**Above the rank of division head** or division superintendent the line of promotion in a large plant is more clearly defined. A division head will become a branch manager or superintendent, with a number of divisions and thousands of employees under his control. Thereaf-



*"I have known of many executives in my time who could change over from one company to another and never even turn a hair."*

**"... most companies make a practice of paying any supervisor more money than is received by anyone reporting to him."**

**"In a governmental organization the setup may well become more confusing."**

ter, there may be but two promotional moves possible: assistant works manager, and works manager. Above this latter august personage (who has the entire 50,000 mythical employees reporting to him), there can only be the officers of the corporation—possibly a vice-president, president, and chairman of the board. But so far as production is concerned, the works manager actually calls the shots.

*The above is a general line-of-promotion, and working as consultant or executive in 20-odd large corporations, I have found it pretty much standard. Sometimes the straw boss is called a section head; sometimes, in a smaller concern, the branch manager may not appear at all. Otherwise, in private industry, you know pretty well where the line of demarcation occurs between supervisor and executive.*

In a governmental organization the setup may well become more confusing. Of course, there the outfit comparable to a private corporation is usually termed "bureau." The head of this bureau (and perhaps his assistant) is politically appointed and may know little about the work of that bureau. But governmental organizations often prefer the term "department" as rating above that of "division" and this is at times confusing to an outsider. A department head in private industry may be an office manager or foreman and definitely rates as a supervisor. This governmental de-

partment head corresponds to industry's division head—indeed, this individual may even rank with a works manager.

**The top brass in a governmental organization** may be either a "bureau chief" or a "department head." The deciding point here is whether or not he holds a civil service rating. If he does not, he is a political appointee, and everybody knows he is at best a temporary boss. *The highest ranking civil service employee is the real boss of any governmental bureau.* He will be there forever, barring death or malfeasance. This fact has caused many a political appointee a violent series of headaches, until he discovers who really is running that bureau or "department."

In most governmental organiza-



*"In order to discuss intelligently the transition from supervisor to an executive, it is well to utilize standard terminology."*

**"He knows that management rarely offers the big jobs twice to the same man."**

***"... most companies make a practice of paying any supervisor more money than is received by anyone reporting to him."***

tions the civil service tycoon is head of a department. To him reports a number of "division heads" who are of much less importance, and who definitely rank as supervisors. This fact is confusing; then you appreciate that the "Post Office Department," for example, cannot have a division chief as its head.

To civil service employees these matters are of paramount importance; just as a "division head" usually outranks by far a "department head" in private industry. This discussion is wholly germane to the problem we are discussing.

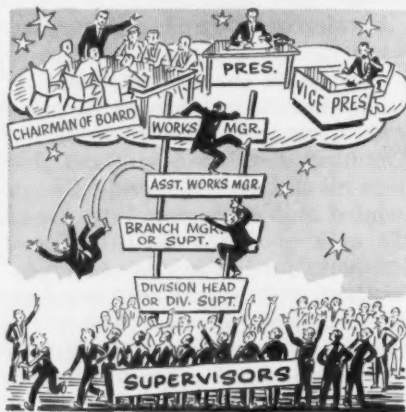
If we limit our consideration to the private corporation, which (thank goodness!) still is the more common type of organization in these United States, we find all of these terms vitally important to the ambitious employee.

Thus, he may go to work for the company in a minor capacity and within a few years find himself put in charge of a small group of workers. This is his first opportunity to show what he can do as a supervisor — when he must achieve results solely by directing the efforts of others.

**This is a tough transition for most employees;** until then their record has depended altogether on their own work. Now they cannot touch a machine except when teaching some worker a new technique. Some newly created supervisors make the grade; others beg to be

put back on their old job. But most companies now make a practice of paying any supervisor more money than is received by any one reporting to him. This makes sense, as well as allotting the boss special parking space and other perquisites. A supervisor who makes less money than his subordinates is in a very difficult situation.

(Incidentally, this identical situation faces the engineer in today's industries. Despite all the talk about shortages of engineers, it is not uncommon to find an engineer of some experience receiving less pay than artisans in his department.) I am not criticizing this practice; merely calling attention to it. We also have a terrific shortage of tool-and-die-makers, but little is said of this form of shortage. I know welders who receive \$220 weekly in Los Angeles



***"The above is a general line-of-promotion . . . which I have found pretty standard."***

***"... he must develop a group of immediate subordinate supervisors who have implicit faith in his judgment . . ."***

**"He knows that management rarely offers  
the big jobs twice to the same man."**

aircraft plants, where an engineer would have to be a lallapalooza to be accorded six or seven hundred dollars a month. (Of course, all these salaries are before taxes, but engineers who believe in the law of supply and demand wonder what goes here.)

If we may consider the case of an average employee in a metalworking plant of fair size, we may assume he has been around for 20 years as artisan and supervisor before he is considered by management for the truly big job of executive. By then he may well have advanced to the rank of foreman, general foreman, or office manager. He knows his job and that of every employee reporting to him, inside and out.

Now comes the "crucial" period. He is drawing down good money, even after taxes. *He may not wish*

*to advance any further in his company and frankly says as much. Or, he may be sufficiently ambitious to wish to take a crack at a really big executive job—one that may give birth to a sizeable crop of ulcers, but which also will put his salary and perquisites up among the top men of the company.*

**In the best American tradition** he will make a try at the big job—if he can qualify for it. He knows as well as anyone that this is the "path that leads on to fortune," and the logical line of promotion open to him. *He also knows that management rarely offers the big jobs twice to the same man.*

Despite the discouraging fact that American executives are notoriously short-lived (I think very soon top-flight management will take firm steps to remedy this matter), this man would like to be a superintendent or general manager. And management has frankly indicated to him that he is being seriously considered for the big step from supervisor to executive.

How does the supervisor's wife feel about this matter? Well, if she is typical, she wants him to have the new job providing this does not shorten his life expectancy. She has put in a lot of time and tough work helping him get to where he is; she believes he is just as good as the best man in the plant, and sees no earthly reason why he should not get that big job ahead — and of course she has no objection what-



**"The highest ranking civil service employee is real boss of any governmental bureau."**

**"... the executive can readily create unfavorable  
public relations in his dealings with customers ..."**



**"... he must develop a group of immediate subordinate supervisors who have implicit faith in his judgment ..."**

ever to being Mrs. General Manager! If she has head any unfavorable statistics regarding the longevity of top-flight executives, she may well say "This won't happen to my man. I'll continue to take good care of him, just as I have during the past 20 years."

**What happens next** depends in considerable degree upon the prospective executive, his wife, the company's personnel manager, and the big boss himself. If the supervisor and his wife are agreeable to the big step upward, the shots henceforward will be called by the personnel officer and the head man of the corporation. Heretofore, promotion may have been a single matter; now it can become exceedingly complex.

Now management is selecting a man who can decidedly influence company policy, who must meet the

biggest men in his own and allied industries, who must possess a personality that will get across in a public address and thus make friends for the company; who is big enough to appear before governmental committees and make a favorable impression, even should he and his company be under attack.

At the same time, he must create and maintain harmony among employees numbering perhaps in the thousands; men and women he almost never contacts directly. Specifically, he must carefully direct the efforts of three or four, or a dozen, high-ranking supervisors, keep these men on their toes, yet without ever antagonizing any of them. He must see to it that production in his division never slumps off, but that the morale of the employees remains high, no matter what. *He must also be big enough to deal, whenever necessary, with tough representatives of labor unions, maintain friendly relations with his fellow executives, and of course remain on good terms with the big boss.* Quite an assignment.

**Somehow he must develop a group of immediate subordinate supervisors who have implicit faith in his judgment, who are forever abreast of the latest developments in methods and machines, and who may in turn be depended on to keep the plant at all times properly staffed and equipped.** He must learn how to crack down on a shirker, and how and when to praise. He



**"... most companies make a practice of allotting the boss special parking space ..."**

**"Bringing an outsider into the company as a high-ranking executive is risky business."**

... men who demonstrate speci... of how good a man the outsider



**"... the executive can readily create unfavorable public relations in his dealings with customers ..."**

must never be swayed in his judgment by a handshaker, and he must never fail to defend the people reporting to him when these are criticized by anyone, within or without the company.

Obviously these are not easy chores, and it is not surprising that management is going to look this fellow over pretty thoroughly before entrusting him with such increased responsibilities. Without doubt, in the new job he can put the entire company behind the eight ball or make it the most successful organization in its field, and do these things in a matter of hours.

But this is by no means all. Corporations and governmental bureaus which have employed a supervisor continuously for 20 years suddenly may perhaps become extremely cautious when it comes to converting this man into an executive.

Until now, the company has been interested only in the man's ability to handle men (and women) and get out production without creating ill-feeling or ill-health among the workers. Production, of course, is of paramount importance; morale and accident prevention may have a lot to do with good labor relations and must continue to be emphasized.

**But the executive's field will become infinitely wider than this.** He can readily create unfavorable public relations in his dealings with customers, with the executives of various other corporations, and with powerful governmental officials.

Because of this fact, management will study most carefully the supervisor's 20-year record in regard to a number of factors that are now suddenly extremely important. Also, if a firm of management consultants happens to be employed, it may be that these experts will have ideas of their own in assisting management to determine that the right man is selected for the executive job.

In instances, both management and these consultants will come up with a unanimous, unpleasant decision: "There isn't a single supervisor in our company who is fitted for this job." This situation may be nearly tragic, and may not be altogether the fault of the supervisory force. Management appreciates it has long had a definite responsibility for developing a number of the right type of men in its supervisory



"He may not wish to advance any further in his company and frankly says as much."

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**"... it is possible he may be asked to take a psychiatric or psychological test ..."**

years of satisfactory service, man- who have been subjected to this

**"Bringing an outsider into the company as a high-ranking executive is risky business."**

force—men who demonstrate specific potentiality as executives.

This responsibility goes right down the line. In some companies a supervisor who is being considered for promotion to executive rank will say, "But there is no man in my organization who can take my place." *This supervisor instantly ceases to be considered as potential executive material.* Every supervisor and executive knows he must develop a capable "second man" as soon as possible. If none exists, he must ask the personnel department to go out and get one.

**Bringing an outsider into the company** as a high-ranking executive is risky business. I have cited one exceptional instance when this action worked; I could cite a score of instances when such action caused nothing but friction, regardless



"He must be big enough to deal with labor unions, fellow executives, and the boss."

of how good a man the outsider happened to be. A group of unhappy, frustrated supervisors can make a lot of trouble for a new executive from outside.

This is a natural occurrence. All of these supervisors feel that one among them should have been chosen for that big job; they have been working together as a team for many years, perhaps decades; now they are going to find it imperative to take orders and no doubt readapt their ways of doing things to suit a strange boss from "outside." Only an exceptional outsider can be successful in winning the wholehearted cooperation of these particular supervisors.

**But when the new executive is to be selected** from the existing supervisory force there will yet be many obstacles for him to overcome. The least of these may be any feeling among his brother supervisors that perhaps one of them, rather than himself, should have been chosen for the big job.

In some corporations the man whose experience record marks him as the logical choice for this big promotion finds himself up against a series of hurdles the like of which he has never experienced when moving smoothly up the ladder, perhaps all the way from artisan to general foreman.

Without attempting to pass judgment on the worth or advisability of these obstacles to be overcome, let us list a few: First, despite 20

**"... the wife of the new executive also must be tested before his appointment can be confirmed."**

complete faith in the wisdom of his with a dinner party given by the

years of satisfactory service, management may decide the potential executive must demonstrate that he possesses genuine administrative attributes, and that he does not possess any hidden or unsuspected weaknesses which would be ruinous to the company, once he has been entrusted with a considerable amount of managerial authority.

If we may assume that management, and particularly the personnel department, has not been able to make up its mind about this supervisor during 20 years of daily association with him, *it is possible he may be asked to take a psychiatric or psychological test (developed by the firm of management consultants), designed to probe into the innermost recesses of the man's soul and determine what goes on there.*

I have talked to many executives

who have been subjected to this treatment before being accorded managerial status, and I have yet to find one who could look back on the ordeal with objective equanimity. Most of them, to put it mildly, were still boiling. Their feeling appeared to be that the test was wholly unnecessary, and that any such unpleasant, but repressed urges in their innermost beings probably would have popped out at some time during their 20-year period of service. Obviously, the questions asked in the test (which may have required many hours to answer) were of a type that bring to the surface a lot of latent antagonism, if nothing else. Perhaps this is not the very best method of preparing a newly created executive to take over duties which will call for 100 per cent loyalty to his company and



"This supervisor instantly ceases to be considered as potential executive material."



"... it is possible he may be asked to take a psychiatric or psychological test . . ."

**"The big step for any supervisor is that from foreman or office manager to superintendent or division head."**

"... the wife of the new executive also must be tested before his appointment can be confirmed."

complete faith in the wisdom of his management.

**In my own experience as personnel officer,** I have never found it necessary or advisable to give such tests, either to supervisors or executives. I much prefer to place dependence on the day-by-day observation of the man's superiors over a long period, together with a careful check of the man's performance record on the job. Above everything, I would want this new executive to feel kindly toward his management, and imbued with the same spirit of loyalty he has displayed during the years that he has worked as supervisor.

The other experience that sometimes comes as a genuine shock to the potential supervisor also may result from advice given management by a firm of consultants. This occurs when some advisor decides that *the wife of the new executive also must be tested* before his appointment can be confirmed.

The reasoning here appears to be that the "little woman" may well become the confidante of her husband and will then be in possession of important company secrets. The question in the mind of the test-maker is *whether or not she can keep her mouth shut* under varying degrees of pressure. Also, just what sort of impression will the little woman make on the firm's customers, should she be called upon to meet them socially.

Such a test as this usually begins

with a dinner party, given by the potential supervisor's wife at the instigation of management, where the guests include all the bigwigs of management and their wives. The guests are, of course, the ones who thereafter rate the little woman as to appearance, social grace, and a number of other factors.

If we may assume the wife has spent 20 years taking care of her big lug of a husband, raising a number of offsprings (some of them will yet be teen-agers, and who are expected to be present at the dinner), it may be obvious that the little woman is in for a very interesting evening.

If everything goes off well, she passes *her* test with flying colors. (Actually, she really should receive a diamond medal for this. With the



"With the difficulty of securing help in preparing a formal dinner . . . it will be a miracle if she can impress her guests."

One of two hot air valves used in the bleed air system of the Lockheed F-104A Starfighter. Flame-Plating of the bearing surface is said to eliminate galling and also assure a low coefficient of friction in spite of high unit loading and high temperatures.



difficulty of securing help in preparing a formal dinner for eight or ten, and with the wholly unpredictable behavior of one or more teen-agers to contend with, coupled with the problem of making herself attractive as she prepares such a whale of a dinner, *it will be a miracle if she can properly impress a majority of her guests.*)

But this dinner does not quite complete the wife's test. Thereafter, she may well be invited to a cocktail party at the home of a company executive and determination will be made of her behavior after she has put away three Martinis on an empty stomach, at an hour much earlier than she has been accustomed to drink her solitary cocktail before supper.

This test, in which the wives of



"... she will receive a number of demerits if she attempts to demonstrate how a native-born Kanaka would perform the hula-hula."

higher executives are to be the judges, is one that is insisted upon by certain management consultants. Apparently the little woman's tongue must not be loosened an iota by all that unaccustomed liquor, *and of course she will receive a number of demerits if she attempts to demonstrate how a native-born Kanaka would perform the hula-hula.* (This actually has happened at such a party.) Furthermore, there are other tests given of the wife's ability to hold her liquor, and her tongue, while refusing to fall on her face or slide under the table.

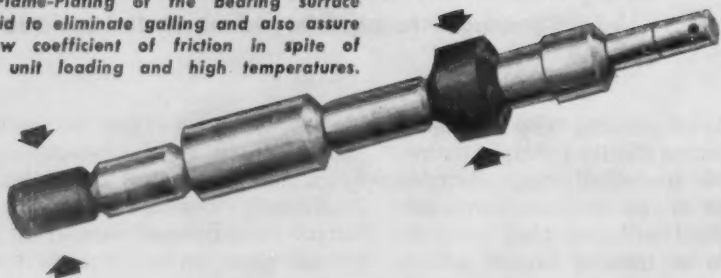
**Please believe me, these are not fanciful tests.** They are becoming more and more common. The little woman has had things fairly easy for 20 years. Now she is to become the wife of an important executive. She has always done everything possible to further her husband's career. She will do her darndest to make the grade here, otherwise she will feel she has let her man down at a most important juncture. But three unaccustomed Martinis on an empty stomach! Perhaps any tests given her husband will be mild compared to this.

The big step for any supervisor is that from foreman or office manager to superintendent or division head. No doubt the added pay, prestige, and perquisites are well worth all the effort that is entailed in passing a series of tests, both on the part of the supervisor and on the part of the supervisor's wife.

## Unique coating process solves wear problem for Lockheed's F-104A Starfighter.

Jet plane parts are subject to through the gun barrel. The gases

an system of the Lockheed F-104A Starfighter. Flame-Plating of the bearing surface is said to eliminate galling and also assure a low coefficient of friction in spite of high unit loading and high temperatures.



## Flame-Plated Valve Takes to the Air



Lockheed F-104A Starfighter jet plane, equipped with Flame-Plated hot air valves.

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## Unusual Lathe Setup for

Boring head is used in conjunction with different types

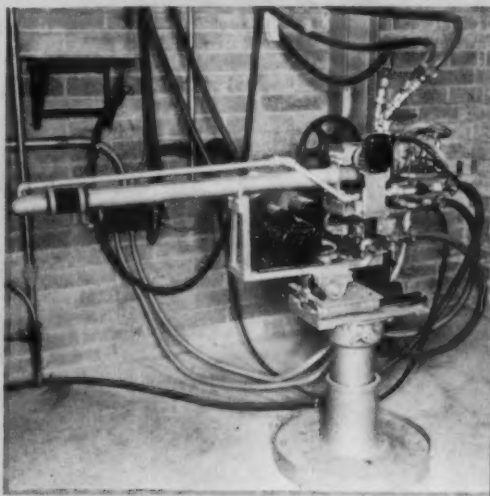


**Jet plane parts are subject to almost incredible extremes of heat and abrasion.** Lockheed's F-104A Starfighter is no exception to this rule; rather, as one of the fastest and highest-flying fighters it creates the greatest extremes in temperatures and operating stresses. Important parts of the system of this particular aircraft are the hot air valves which are subjected to very high unit loads and temperature extremes.

Lockheed engineers searched and tested many materials and methods which would eliminate galling and provide a low coefficient of expansion over the required service life of the part. Their answer, after many hours of test and research, was Flame-Plating the bearing surfaces with a coating of tungsten carbide. The Flame-Plated parts show practically no wear after being subjected to actual flight testing for the service life of the part. As a result, the process is now part of the company's regular production procedure.

Flame-Plating is a process developed by Linde Company, Division of Union Carbide Corporation. The process works as follows: Particles of tungsten carbide or aluminum oxide are fed into the chamber of a specially constructed gun. The particles are suspended in a mixture of oxygen and acetylene and this mixture is ignited. A detonation wave traveling at 10 times the speed of sound carries the particles

through the gun barrel. The gases inside the barrel attain temperatures approaching 6000 degrees F., which heats the tungsten carbide particles to plasticity. At supersonic speed the plastic particles are hurled at the workpiece and embedded by being microscopically welded at the interface. Despite the barrel temperatures of the gun, the part undergoing plating seldom exceeds 400 degrees F. Thus, no metallurgical changes are induced and heat warping cannot take place. By successive detonations, coatings of 0.002 to 0.010 inch can be built up. Coatings can be finished to a smoothness of 1-2 microinches r.m.s.



*Flame-Plating gun used by Linde Company in its special process for protecting metal parts against wear, abrasion and corrosion.*

## **Milling and Jig Boring**

# Unusual Lathe Setup for

**Boring head is used in conjunction with different types of simple-to-make faceplates for use in the machining of various workpieces.**

By ANDREW MIHALKO

Utilizing a boring head mounted in the tailstock of a lathe, the setup shown in Fig. 1 has been found very useful for performing light duty milling and jig boring operations. The faceplate used is inexpensive to make due to its size,

and a number of different kinds of faceplates can be made up to accommodate different types of work. The dial shown on the head is graduated in thousandths of an inch.

Referring to Fig. 1, the boring head, A, is fitted into the quill of

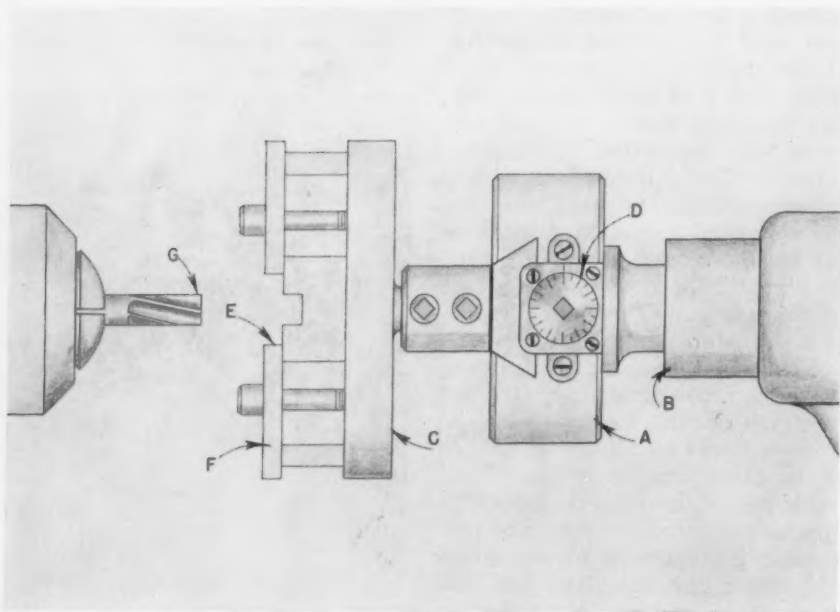
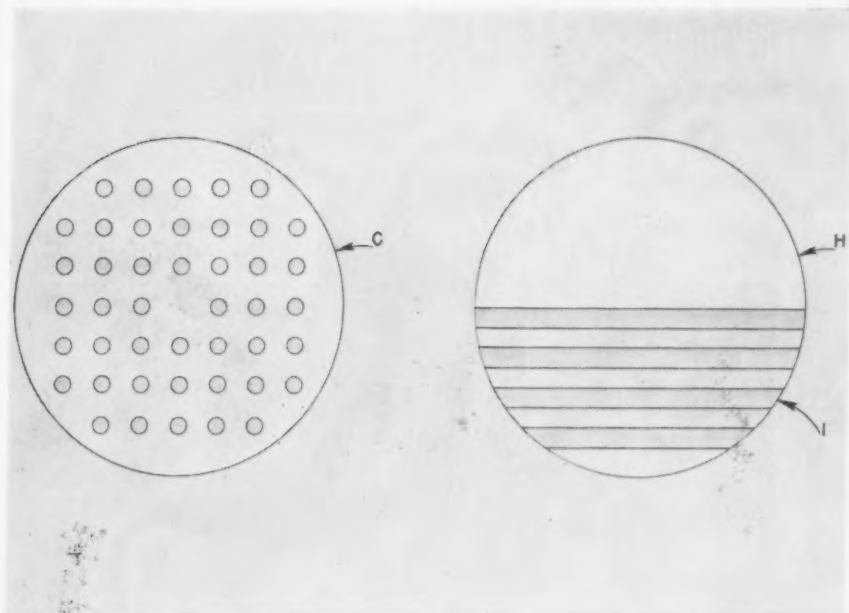


Fig. 1—Boring head setup for performing light duty milling or jig boring operations on a lathe. Setup permits use of different types of faceplates for work-clamping purposes.

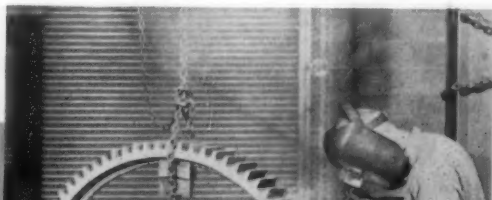
the tailstock, *B*. Attached to the boring head is a faceplate, *C*, which has a shank turned thereon that fits into the hole normally used for holding tools in the boring head. The dial, *D*, is used for movement of the faceplate, the movement being in keeping with the cross slide on the lathe. The work, *E*, is held to the faceplate, *C*, with two clamps, *F*, in the manner shown. The tool, *G*, is used for milling the work, the tool being held in the headstock of the lathe by means of a collet which

is tightened on the tool with the aid of a draw bar.

The sketch at the left in Fig. 2 shows a front view of the faceplate, *C*, wherein a series of holes are drilled and tapped to a suitable size for work-clamping purposes. The sketch at the right shows a faceplate, *H*, having a series of keyways machined in it, as indicated at *I*. With this type of faceplate, a piece of key stock can be used as a parallel and located in the keyway best suited for clamping the workpiece.



**Fig. 2—(Left) Faceplate having series of drilled and tapped holes for work-clamping purposes. (Right) Faceplate having series of keyways for accommodating key stock for clamping work.**



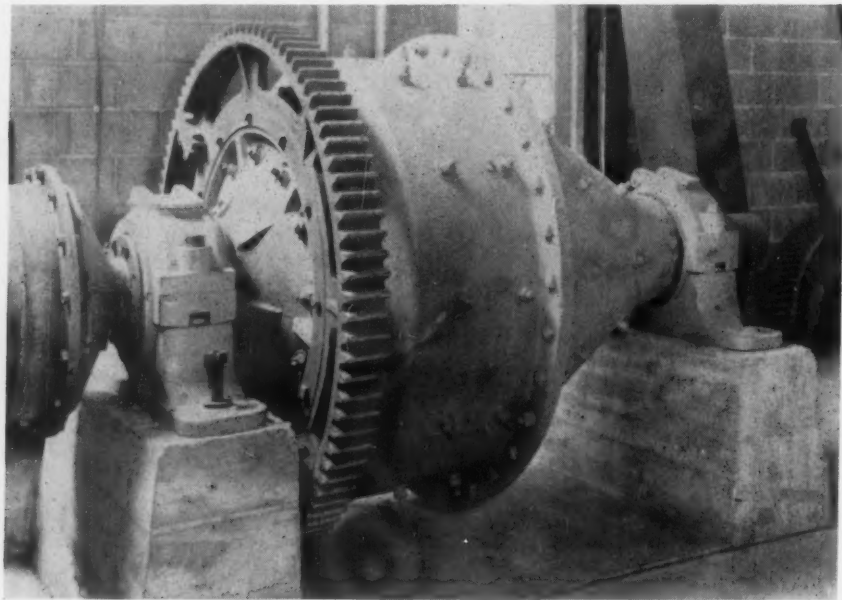
# **Hard-Facing Spur**

***Ball mill gears exhibit unusual wearing qualities after hard-facing treatment.***

By BARTLETT WEST

**An increase of over 34 times in gear life** through hard-facing has been disclosed by a prominent midwestern manufacturer. The gear in question is used in a ball mill

operation. The hard-facing material responsible for this remarkable improvement in the wearing qualities of the spur gear is Colmonoy No. 2, an iron-base electrode containing



**Hard-faced gear in place on ball mill. Projected life of this gear (based on performance to date) is in excess of 5,000 hours, despite severely abrasive service conditions.**

## **Controlled Hardening of Steel Parts**

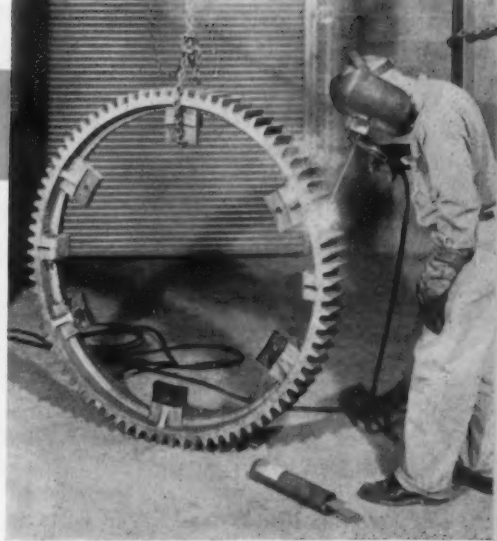
# r Gears

chromium, molybdenum, silicon and carbon.

The ball mill is used to process various metallic compounds that contain extremely abrasive ingredients. In the process of reducing the particle size, metallic dust emanates from the rotating ball mill and settles on the driving gears. This condition decidedly complicates the problem of gear wear.

The pinion gear is fabricated of hardened steel and being small in size it resists fairly well the abrasion of the metallic dust deposits. Original equipment spur gears, however, are too large to economically permit making them of the same material. To hold cost down while providing wear resistant qualities suitable for normal service conditions, the ball mill manufacturer produces the spur gears of a special type of high-grade cast iron. The new gears have cast, unmachined tooth surfaces.

When first installed, the spur gear operated but 80 hours before being worn to the point of uselessness. It was at first assumed that the gear was either the product of an unsound casting or out of tolerance in some way. Another gear was ordered and installed with approximately the same result. In all, a total of four original equipment replacement spur gears were tried



*Hard-facing worn spur gear by d. c. arc welding with a Colmonoy No. 2 electrode.*

with similar results in every case. No gear lasted longer than 140 hours in this service.

At this point, it was decided to try hard-facing the spur gear on the wearing face of each tooth. The result was a gear that, after 1,760 hours of operation under identical conditions, showed no visible signs of wear. Based on performance to date, it is anticipated that total gear life will exceed 5,000 hours.

The Colmonoy No. 2 electrode is applied by d.c. arc welding to the wearing face of each spur gear tooth. The deposit is laid in a series of beads approximately  $\frac{1}{8}$  inch thick using a  $\frac{3}{16}$ -inch diameter electrode. Following welding, the deposit is ground smooth using hand equipment. The gear is then ready for installation in the mill.

# Controlled Hardening of Steel Parts

***Parts of various shapes are easily hardened without scale formation or decarburization.***

**In the shop of a firm producing a variety of tools and parts,** quality hardening of all types of high speed and high carbon high chrome steels is easily accomplished with the Sentry Model "Y" furnace installation shown in the accompanying illustration. This furnace, in conjunction with the positive, neutral Diamond Block Method of Atmospheric Control, permits

"soaking" tools and parts to assure maximum hardness without formation of scale or decarburization. According to shop officials, the protective atmosphere developed is constantly correct, thus assuring duplication of quality hardening from day to day. This simple method of producing a truly neutral atmosphere is automatic and requires no adjustment by the operator.



**Steel parts are inserted by worker into controlled atmosphere furnace for hardening.**

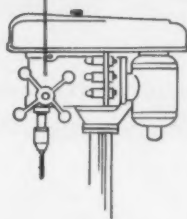


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## DRILL PRESS



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There are more hand fed drill presses in use than any other machine tool. They are all pretty much alike. The operator positions the work in a jig or fixture, feeds the drill in and out of the work by hand.

It's a tiring job. Towards the end of the shift both quality and quantity suffer.

Let's put a Bellows Drill Press Feed on the star wheel shaft. Now, the operator touches a lever. Automatically the drill is fed in and out of the work, under perfect control. Production is increased 20%-30%; quality is better; tool life longer.

Let's go a step farther. Add a Bellows Rotary Feed Table. Now all the operator has to do is load parts. The table automatically positions the part under the drill, the drill press feed automatically feeds the tool, the table indexes to eject one part and position another. Production is more than doubled, often more than tripled.

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**"... no pressure controls must be set to produce assemblies with consistently acceptable rivets."**



*"Hot squeezer" shown here has been equipped with temperature-sensing control unit to permit successful riveting of titanium at Boeing Airplane Co., Seattle, Washington.*

## **Driving Titanium Rivets**

***"Hot squeezers" equipped with temperature-sensing controls do consistently good work in riveting titanium at Boeing Airplane Company.***

By THOMAS A. DICKINSON

Since they became available in commercial quantities, titanium and its alloys have created many serious problems for metalworkers. But none retarded progress more than the problem of how to drive titanium rivets. The reason for this is that, in many instances, riveting is the only practical method of assembling titanium parts, and rivets comprising dissimilar metals

cannot be satisfactorily employed because of their tendency to promote corrosion.

It has long been a well-known fact that titanium rivets can be heat-formed with good results, but until recently such work could not be done on a truly efficient production basis because forming temperature was a critical factor. In other words, rivets that were a little too

**"... no pressure controls must be set to produce assemblies with consistently acceptable rivets."**

hot or a little too cold would either crack or become contaminated with gases when they were driven.

Squeeze riveters with time-control heating facilities of the type used in driving stainless steel rivets failed to give completely satisfactory results because they did not have provisions which would assure the proper heating of titanium parts with varying dimensions and compositions. However, engineers at Boeing Airplane Company, Seattle, Washington, have discovered that "hot squeezers" can do consistently good work in riveting titanium if these machines are properly equipped with temperature-sensing controls.

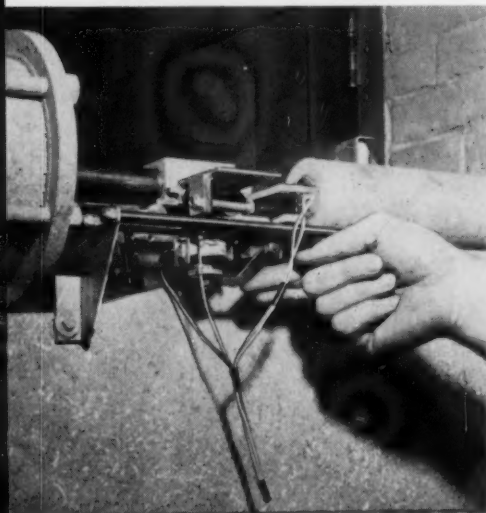
The specific control unit used by Boeing is a thermostatic device which maintains a predetermined electrode dwell pressure while a rivet is being heated, and then causes forming pressure to be applied as soon as the rivet has attained a specified temperature. Because the control unit can be preset to apply forming pressures at rivet temperatures ranging from 500 to 800 degrees F., depending on the chemical composition of the materials being assembled in each instance, no timing device is needed to drive rivets with varying dimensions. Similarly, because forming pressure is automatically regulated in accordance with each temperature adjustment, no pressure controls must be set to produce assemblies with consistently acceptable rivets.

★ ★ ★

## **Jump-Cut Machining of Rotor Segments**

**Severe jump-cut machining problems are being solved at Alpha Industries, Inc., Logansport, Ind., by a change-over to "throw-away" button insert tools. Tool costs have been cut to one-fifth and turning speed has been increased as much as 48 per cent in rough turning AMS 6302 brake rotor segments. Sixteen of these segments are clamped to a faceplate in four stacks. They are turned to 13-3/16-inch diameter in four passes at 1/4-inch**

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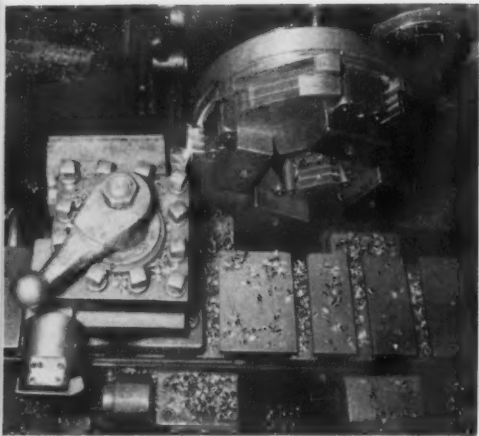


Close-up view of thermostatic control unit that facilitates heat-forming of titanium rivets at Boeing Airplane Company.

November, 1957



## Jump-Cut Machining . . .



In this severe jump-cut machining operation, 16 brake rotor segments are clamped to faceplate in four stacks for rough turning.

depth of cut and 0.007-inch feed. Kennametal's standard Kendex tools and K21 inserts (Style KSDR-85) are used for this job. These square inserts with eight cutting edges are good for machining 384 pieces, 48 segments per edge.

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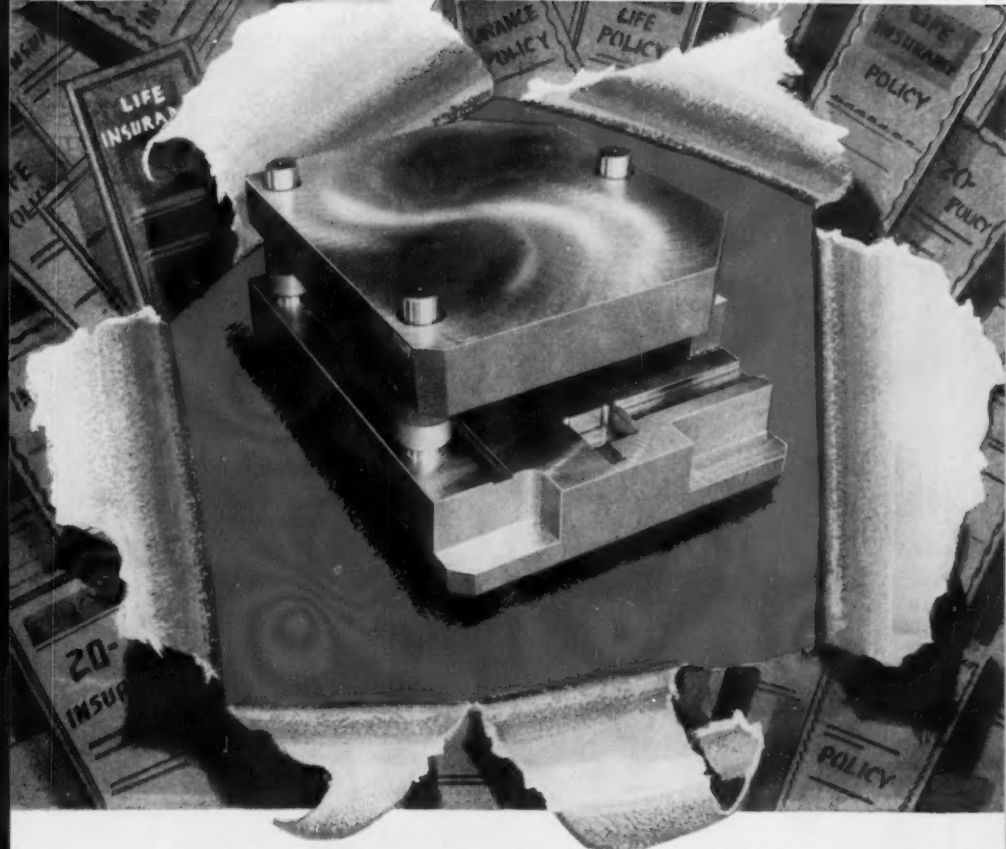
**Screw Machine Products Buying Directory.** The 25th Anniversary issue of its Buying Directory, covering the location and facilities of its member companies, has been published by the National Screw Machine Products Association. The 1957-58 edition contains 80 pages and is designed to assist buyers in quickly locating sources of supply

for their screw machine products requirements. More than 275 companies are listed both alphabetically and geographically for maximum ease of reference.

Of particular importance is the listing of facilities for each of the NSMPA member companies. This listing covers primary equipment, including the type and size range of machines available for contract work; types of material machined; secondary operations available; information covering the particular field or product in which the company has restricted or concentrated its manufacturing operations; and, in addition, any end products which are also being manufactured by the company.

The Directory is available to buyers of screw machine products writing requests directly to the National Screw Machine Products Association, NSMPA Building, 2860 East 130th Street, Cleveland 20, Ohio.





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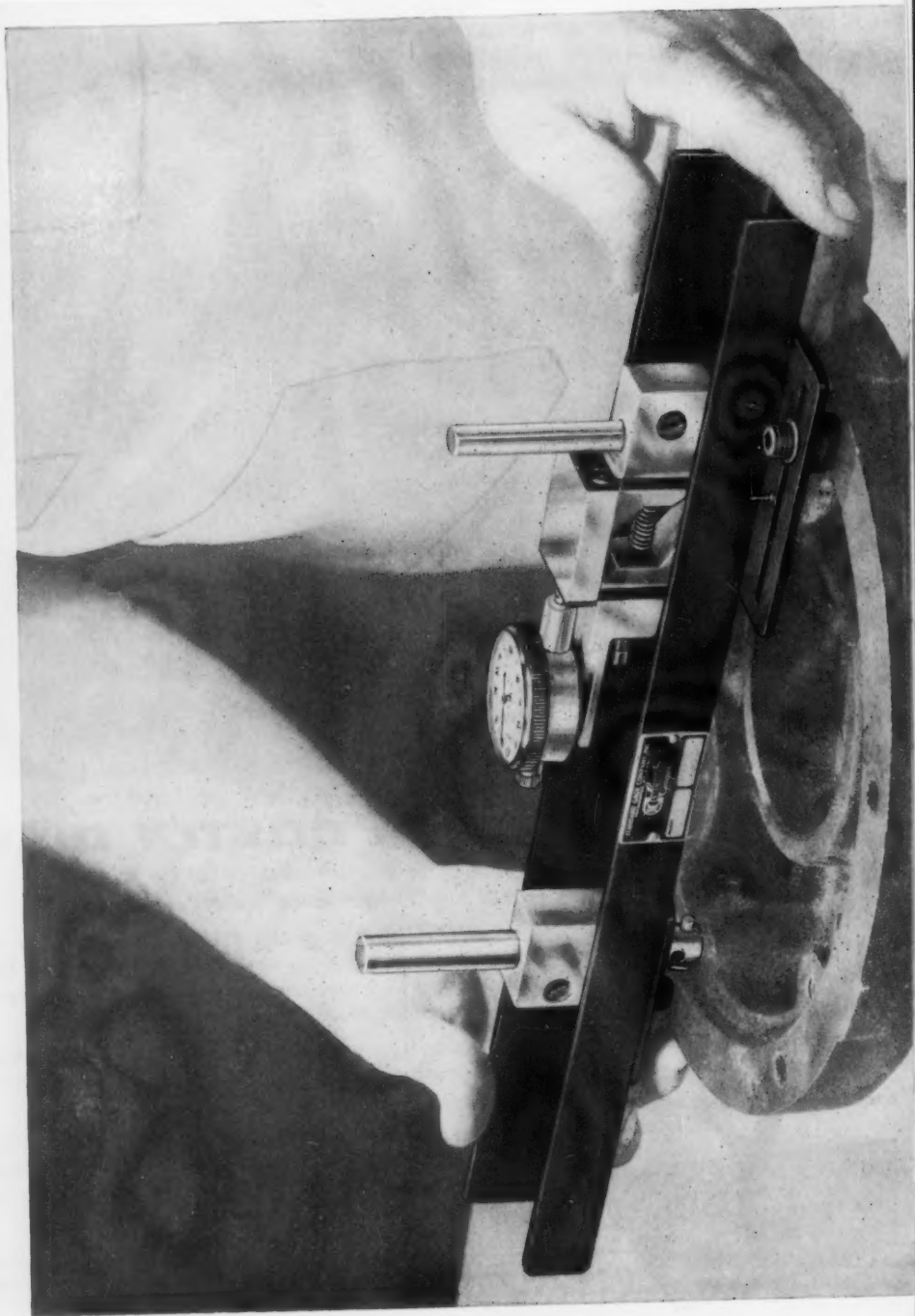
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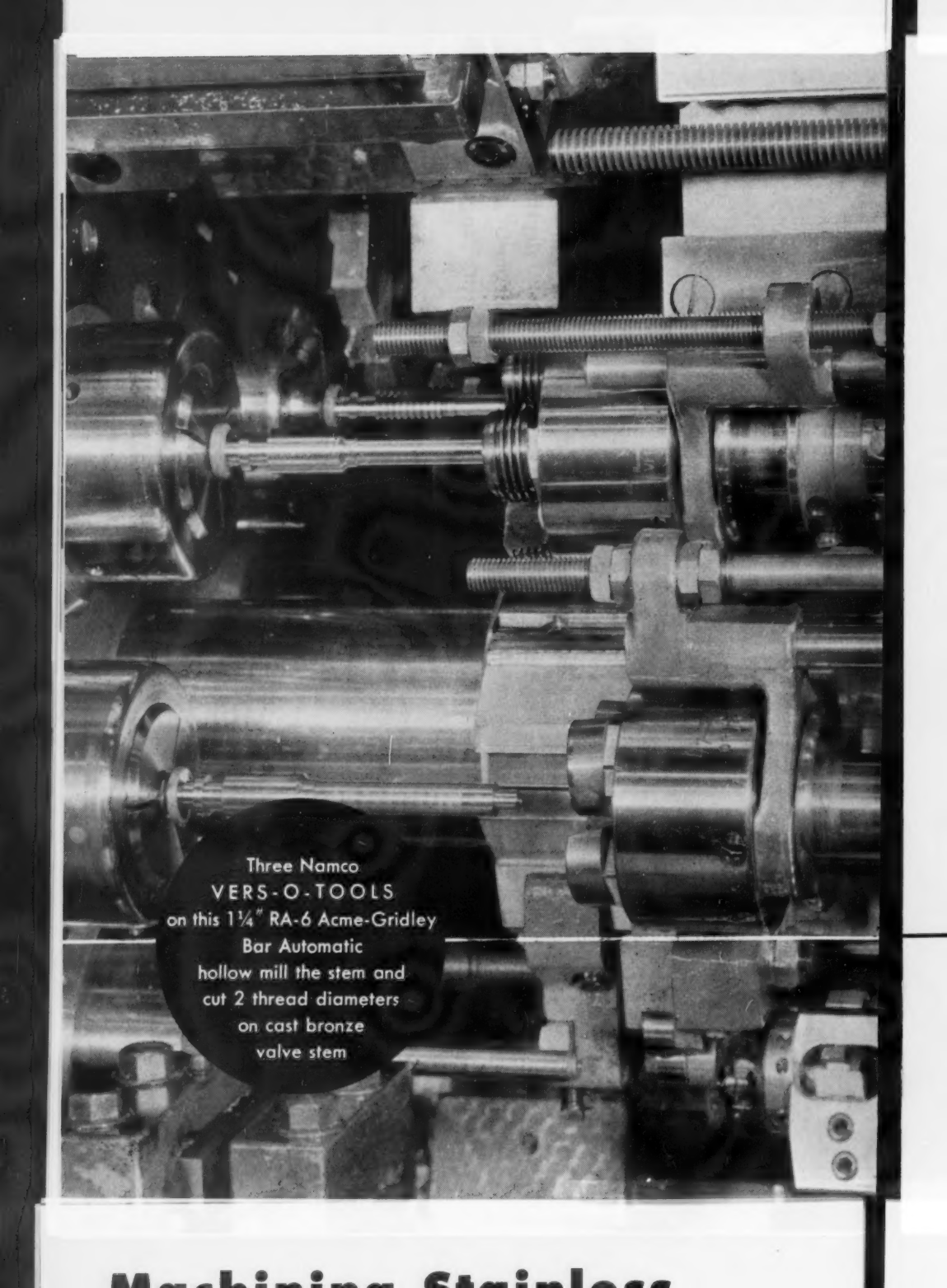
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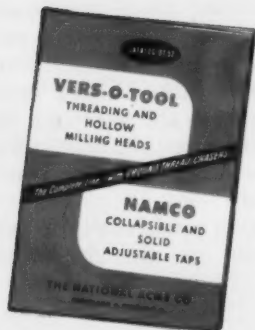


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November, 1957

modern machine shop 135

# Machining Stainless Steel

***This case history points out how tool life was increased in knurling Type 303 stainless steel round on an automatic.***

By G. J. STEVENS

Machining Engineer, Armco Steel Corporation

## Problem:

When knurling a part made of Type 303 stainless steel round on a Brown and Sharpe automatic, the knurls overheated and failed prematurely when set up for conventional feed and speed.

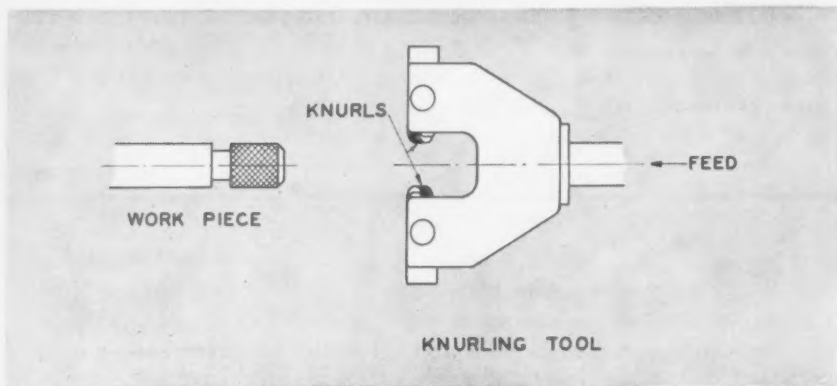
## Solution:

A machining engineer was called in to study the problem. He recommended increased speed and feed to

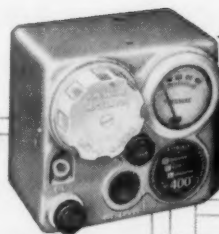
lengthen life of the knurls. They were fed on and off the work very rapidly.

At the slower speed previously used the rapid work hardening rate of Type 303 stainless had contributed to short knurl life. Using a faster on-and-off cycle, the material did not work-harden appreciably before the job was done; also the knurls lasted longer.

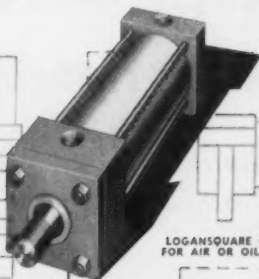
This solution would apply to both types of cross and straight knurls.



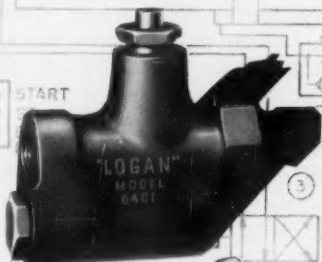
Drawing showing recommended setup for knurling Type 303 stainless steel round.



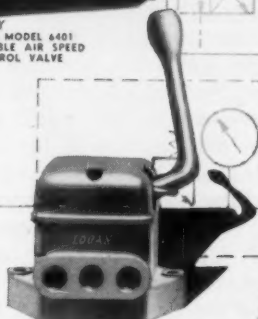
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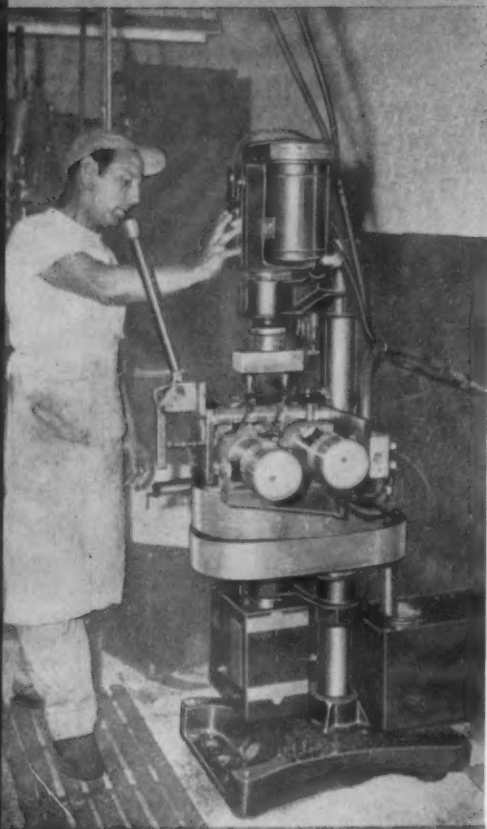
November, 1957

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EXCLUSIVE NEW FEATURES

# Multiple-Hole Drilling of Missile Parts

*Setup provides for simultaneous drilling of eight precision holes from four sides of each part.*



*This illustration shows a drilling setup used at Device Manufacturing Company for multiple-hole drilling missile parts.*

Device Manufacturing Company, North Hollywood, California, had an opportunity to bid on a large production order for missile parts; however, these parts required eight precision holes drilled from four sides. Device did not have enough precision drills to do the job at the speed required, and the company did not have the necessary space to install more drills or the mechanics to operate them.

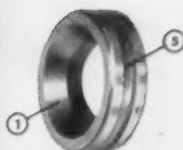
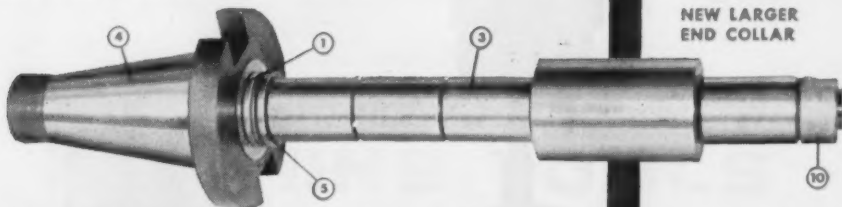
To solve the problem, two Dumore Series 24 automatic drill units were installed on a drill press post. One drill unit was for boring the holes on the topside of the part, and the other drill unit was for boring upward from underneath. Both the top and bottom units were equipped with company-designed dual drill heads so that each could bore two closely-spaced holes.

A fixture was then installed on the drill press post to mount three Dumore automatic drill heads. Here again one of the drill heads was equipped with a dual drilling arrangement so that two closely-spaced holes could be drilled at one time. The five drills were synchronized and attached to a single control. When a button is pushed, all five drills bite into work at once.



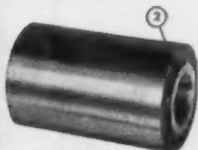
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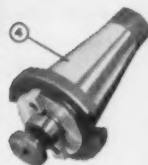
These benefits	... for these reasons	... result from these PREMIUM features
<b>PREMIUM ACCURACY</b>	No "rocking" of spacers when "snubbed up" on arbor.	1. New, larger end bearing and collar insure perfect alignment; 45 deg chamfer in collar for clearance over fillet. 2. Bore and outside diameter of bearing sleeves concentric within .0005 in.; faces of sleeves and collars parallel within .0002 in.
<b>PREMIUM TOOL LIFE</b>	No runout, each tooth of cutter takes its share of the load.	3. Arbor and pilot diameter held to plus .0000, minus .0005 in. with .0005 in. minus tolerance. 4. Taper held within .0002 in., with 10-20 micro-inch finish.
<b>PREMIUM PRODUCTION</b>	Reduce down-time. Reduce setup time.	5. New, larger size and grooved OD make it easy for operator to identify end collars, help to prevent mistakes. 6. Keyways standard in all sleeves and collars. Can be keyed to arbor to prevent rotation. 7. True-running arbor helps eliminate premature cutter failure.
<b>PREMIUM ARBOR LIFE</b>	Accuracy lasts longer. Fortified against breakage under heavy loads.	8. Adjustable spacing collar speeds adjustment between gang mills and saws. 9. Forged steel arbors hardened throughout to 42-45 Rockwell, "C". Sleeves hardened on OD and faces to 60 Rockwell, "C". Collars hardened throughout to 40-45 Rockwell, "C". 10. Hardened and ground threads for arbor nut. 11. New, larger fillet increases strength at stress point between arbor and shank.



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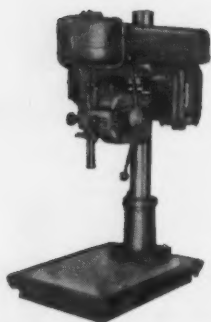
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to cut production costs

# 5 sure ways



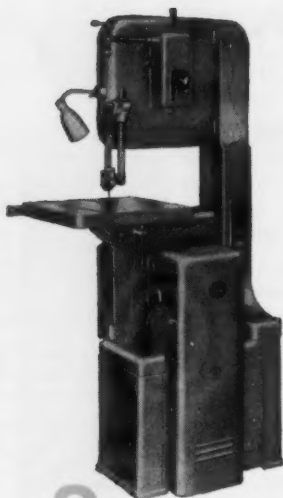
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## 2. USE WALKER-TURNER BAND SAWS

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# Mill·Bore·Shape

## ABSTRACTS OF PAPERS

### PRESENTED AT

CINCINNATI



## TECHNICAL ACTIVITIES SEMINAR

**In order to present and clarify the scope of research activities** at The Cincinnati Milling Machine Company, Director of Research, Hans Ernst, and his very capable staff prepared a group of highly informative papers which they presented to metalworking production executives, management and sales personnel in a two-day session early last month. Never before had an attempt been made to cover the wide variety of research activity which is being conducted at the company on a continuing and ever expanding basis. This activity includes basic and long range research, and applied research leading to the development of many types of products. In the space here and on the following pages are presented only the highlights of the subjects that were discussed. Full texts of the talks can be obtained by writing directly to Hans Ernst, Director of Research, The Cincinnati Milling Machine Company, Cincinnati 9, Ohio.

### Cincinnati Digi-Log Numerical Control

By J. M. MORGAN, J. WILSON  
AND G. CARROLL

**Numerical control has been taken out of the realm of engineering theory** and has become a tool in the trend towards more automatic and easier to operate machine tools. Practically any function now controlled by an operator can be governed by numerical data. At the present time there are many different numerical control systems available for different jobs. These various systems vary widely in size, type, complexity and cost.

Cincinnati Digi-Log Numerical Control is a relatively simple system based upon the use of precision toroidal transformers. It offers a number of unique operating advantages, since the system is both an accurate analog system and an absolute system. The feedback units

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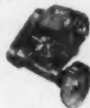
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always give a positive and unambiguous indication of the exact position of the machine elements, with respect to an absolute starting point. Information is not lost when interruptions, such as power failure, occur. Cutter diameter compensation eliminates need for making up different programs for each size cutter.

The numerical data is prepared by a programmer, experienced with machine shop practice, in a manner to achieve maximum operating efficiency of the machine. In the Cincinnati Digi-Log System, this numerical data is punched on cards or on paper tape. The machine control reads the information on the tape or cards and controls the machine in a manner to correspond to the input information. The Cincinnati Digi-Log Control has the additional advantage of being suitable for use either in a positioning system or in a contouring system by the simple addition of supplementary units. Consequently, the actual amount of equipment used will depend upon the type and size of work to be done.

\* \* \*

### **The Spiral Point Drill— A New Development In Drilling**

By HANS ERNST AND W. A. HAGGERTY

**The geometrical shape of the metal cutting drill point** has remained virtually unchanged for over 100 years. The machine made

twist drill, which was introduced about 1860, inherited its point shape from the earlier flat drill. The "chisel edge" which connects the inner ends of the main cutting edges, on both the flat drill and twist drill, is the natural result of generating the point shape by rocking the end of the drill against the face of a grinding wheel so as to provide relief (or "clearance") for the main cutting edges.

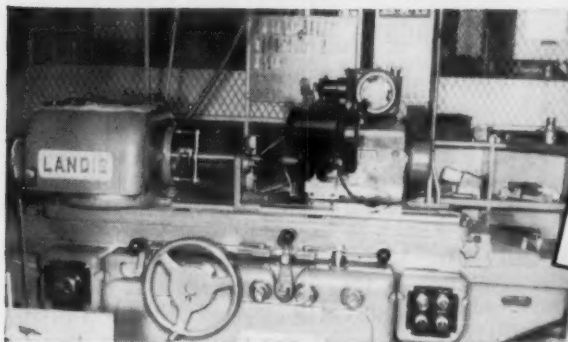
This paper presented a development which derived from a critical study of the conventional chisel point drill; the principal objective being to overcome the well known disadvantages of lack of centering, and poor cutting action under the chisel edge. The development comprises both a new type of drill point geometry (a "three-dimensional spiral point") and a new method of point generation.

Photomicrographs were presented to show the difference in chip formation between the spiral point and chisel point drill. Other data presented indicate the improvement in accuracy and the reduction of thrust force for the spiral point shape. A description was given of the spiral point grinding machine in which a small conical-faced grinding wheel gyrates around the axis of the stationary drill, in an adjustable orbit, so as to produce the desired three-dimensional spiral shape.

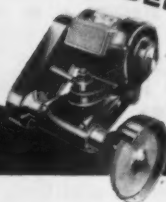
By a minor adjustment on this machine, a modified point shape may be produced which has unique characteristics for the drilling of sheet metal. This new point shape retains the advantage of the self-centering spiral point, and also



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*Precision* TAPPING OF

## TAS Abstracts . . .

eliminates the customary burr and "grabbing" of conventional drills on break-through.

\* \* \*

### Electro-Hydraulic Control Systems

By E. J. RIVOIRA, H. M. FULDNER  
AND O. L. BAILEY

**This paper deals with the intricacies involved** in the design, development, planning, and production of electro-hydraulic control systems. In addition, it described in some detail the electrical, electronic, hydraulic, gaging and systems engineering that goes into one of these control systems.

It is pointed out that for the control of machines, electrics, electronics, optics, pneumatics and hydraulics, used in various combinations provide more suitable control than when used singly. Electrics provide a means of information which is instantaneous, accurate and extremely sensitive. Hydraulics gives precise application of large power at high speed of response.

An explanation is given of the servo-amplifier and servo valves which are an important link between the high speed transmission of information and the high power movement of the load. The paper includes a discussion of improved solenoid valves, a 22 inch hydraulic motor and electro-hydraulic servo controls developed by Cincinnati research groups for precise control systems on machine tools. The con-

tribution of the analog computer in devising and developing electro-hydraulic control systems is also discussed.

To demonstrate the application of these control systems a number of illustrations are used. These include: control of complete production lines, automatic wing skin milling machines, remote control of machine tools, electric and photo-electric tracing, and the new Cincinnati No. 2 Spiralmatic Milling Machine which was designed for milling helical fluted parts. Automatic operation of this machine is made possible, to a large extent, by utilizing many of the developments discussed in this paper.

This paper reviews the development and application of basic building blocks tailored for machine applications. These, when used through the imaginative collaboration of engineers, each a specialist in his field, provide the tools for better machine controls.

\* \* \*

### Chipless Machining

By A. C. HARRIS

**In this paper, the Hydrospinning principle is discussed** in terms of its three basic applications; shear spinning, tube spinning and contour spinning.

Shear spinning employs the sine law principle. The sine law states that the finished cone wall thickness is equal to the flat blank thickness times the sine of one-half the included cone angle of the workpiece.

Tube spinning is essentially continuous point extrusion. Reductions

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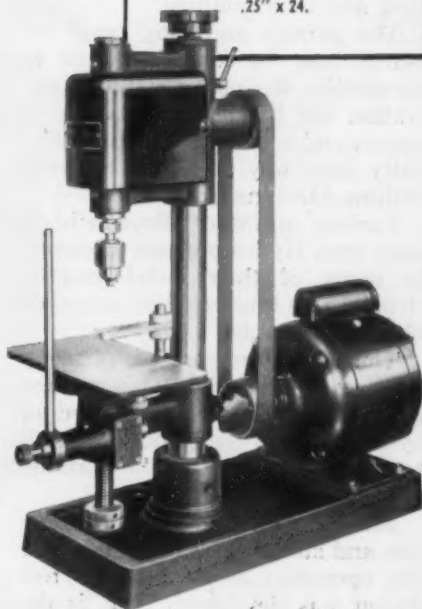
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as high as 88 percent have been made in multiple passes without an intermediate annealing in AISI 4130 steel.

Contour spinning involves the use of a cross slide tracer control to permit spinning of curvilinear shapes which depart from the straight line process of shear spinning and tube spinning.

The current and long range research into the forces required to accomplish the power spinning operation and the plastic behavior of metals under stresses which is presently underway at The Cincinnati Milling Machine Co. is reviewed.

Various metallic alloys which have been Hydrospun are discussed in terms of their metallographic structure, as illustrated by means of photomicrographs.

The Hydroform process of metal forming is discussed. This process uses a rubber diaphragm, backed up by a hydraulic fluid under controlled high pressure, as the forming member.

From research in the force system and structural requirements for this operation, a new type of press design was developed. This is described and illustrated in the paper.

\* \* \*

## **Machining the Unmachinable**

By M. EUGENE MERCHANT

**Industry today faces the challenge of entry into an era of utilization of high strength, high**

temperature resistant, high melting point metals. The most urgent aspects of this challenge are already pointed up in the aircraft industry, which faces the problem of building airframes for high speed flight from such materials as high strength steels, with tensile strengths of the order of 300,000 p.s.i. at room temperature, and 120,000 p.s.i. at service temperatures of 1200 deg. F. or higher. The problems involved in machining such materials are indeed severe, because of the increased rate of tool wear which they engender. Again taking the high temperature airframe alloys as an example, tool wear rates here could increase production times thirty fold or more, over that for aluminum, at today's level of metal cutting technology.

What is required to meet the challenge of high strength metals is a heightened research attack on machining technology, using an approach consistent with the fact that machining is an engineering process, controlled by physical principles which cut across the bounds of any particular type of machining operation or manufacturing process. The approach used at Cincinnati Milling is to carry out a *unified* research attack, both basic and applied, employing all of the physical sciences and engineering. This is accomplished by concentrating the Company's overall program of research on the metal cutting process in a single department — the Physical Research Department — with responsibilities defined within that department for specific scientific and engineering fields. In this paper, this method of attack on the problem of machining difficult materials is illustrated

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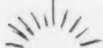
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Recent changes and additions provide many bonus

by case studies from each of these several different fields, showing how new research methods can meet the new challenge.

\* \* \*

## Elements of Electro-Discharge Machining

By ROBIN O. WILLIAMS

**This paper discusses one of the relatively new methods** of metal cutting, electro-discharge machining. This has the unique feature that any metal and most carbides can be machined without regard to hardness, strength or structure. Almost unlimited geometries are possible and the forces are virtually zero. These features and others give great scope to this method.

This process removes metal through the action of an electrical discharge of very short duration and high current density between the tool and work. This process removes material from both the tool and work, but proper selection of work-tool combinations can increase the removal of metal from the work and decrease tool wear. Both the tool and the work are submerged in a dielectric which assists the electrical conduction in the gap and washes out the debris.

Motion pictures taken at speeds up to 7,000 frames per second are used to show the individual discharges and the resulting debris and gas which are swept away by the dielectric.

Wider application of this process

will result from increasing recognition of the importance of this method supplemented by the expected improvements in the machines and tool material.

\* \* \*

## Ceramic Tools Today

By E. J. KRABACHER

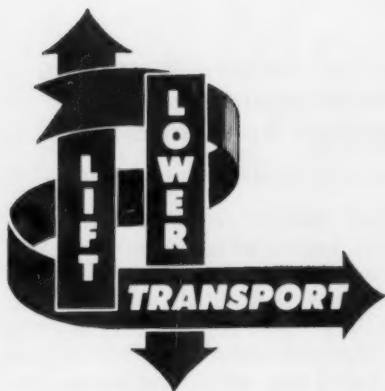
**Today, ceramic tools have captured the imagination** of all in the metal working industry who are interested in achieving greater productivity and economy in machining operations. The research findings reported in this paper indicate that ceramic tool materials are finding a useful place in industry where conditions permit their use.

Ceramic tools have been found to wear differently from cemented carbide tools, due principally to their lower modulus of rupture, and thus greater tendency toward chipping. However, by observing certain precautions and adapting the findings of earlier phases of this continuing research program, effective results can be obtained.

The investigations in turning, reported here, indicate that certain of the ceramic tool materials may even out-perform both the cemented carbides and the cermets on steels, cast iron and many non-ferrous materials if they are properly applied. However, it is shown that this is not true with all available ceramic tool materials.

Studies of milling with ceramic tools at high cutting speeds (when utilizing the above-indicated findings) have shown greater tool life on cast iron, and on certain non-





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## TAS Abstracts . . .

ferrous materials such as pure nickel. Perhaps most significant is the fact that steels such as AISI 4340 and AISI 1018 have been successfully milled with ceramic tools at 2,000 f.p.m., yielding good tool life with no major evidence of serious chipping under good laboratory controlled conditions.

Results to-date, in a variety of operations, indicate that, when properly used, ceramic tools offer the possibility of increased productivity and lower cost per piece.

\* \* \*

## Ceramic Tools Tomorrow

By E. S. FITZSIMMONS

**Fundamental considerations of oxide systems** used for ceramic tools indicate that definite improvements may be realized in these materials in the future.

Consideration is given to the factors contributing to performance of ceramic tools cutting at high speeds. These studies indicate that strength, hardness and chemical inertness at elevated temperatures are the properties of ceramic systems which contribute most to good performance in the cutting operation. The relationship of these properties to composition and processing of oxide systems is given and approaches are suggested to attain higher quality products.

The possible future for metal-bonded ceramic compositions, namely the "cermets," is next considered. This field is held to offer considerable promise. The need for

added research on the wetting and bonding of ceramics by metals in these systems is indicated.

The use of new refractory materials is discussed and indications are given for their future role in the ceramic cutting tool fields.

The importance of rigidity in the cutting application is emphasized. Increased use of ceramic tools can be expected with the more rigid types of systems.

\* \* \*

## Cutting Fluids—Research, Development and Practical Application

By GEORGE VOSMER AND E. J. RITTER

**This paper covers the four main types of cutting fluids** in common use: soluble oils, chemical emulsions, solutions and cutting oils. The basic phenomenon of chip formation is discussed with respect to the action of cutting fluids. Investigation methods and means of testing potential chemicals to aid chip formation are discussed.

The secondary requirements for cutting fluids, such as corrosion resistance, rancidity control, cleanliness, and operator safety, are explained. The necessary research and evaluating techniques developed to improve cutting fluids to meet these requirements are covered, particularly in the fields of bacteriology and corrosion. Suggestions of practical methods of cutting fluid use that can be employed by both large and small consumers are presented with respect to shop control of the cutting fluid and its application to machining or grinding operations.

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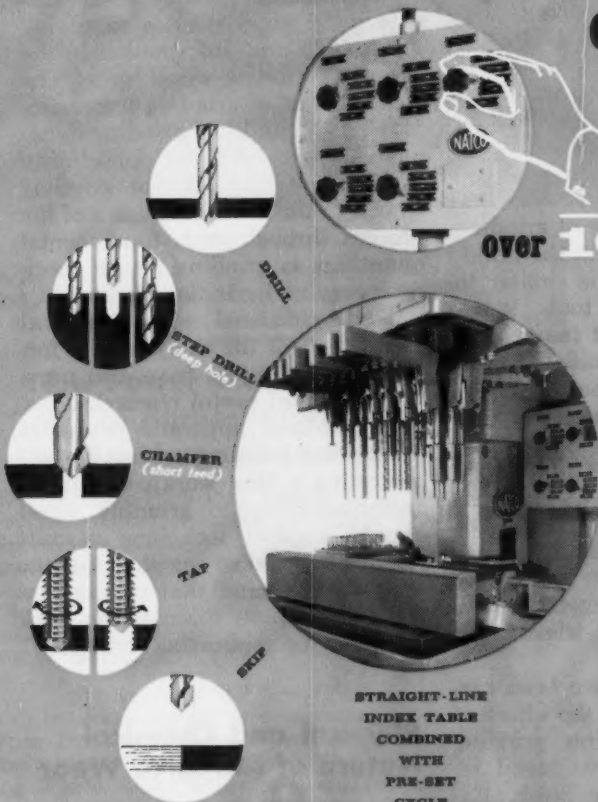
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## Factors Affecting the Wear of Grinding Wheels

By E. J. KRABACHER

**Optimum utilization of grinding wheels** can only be achieved if the nature of their performance and wear characteristics, and the factors that affect these characteristics, are understood and applied. As reported in this paper, a comprehensive, continuing, grinding research program has contributed to such an understanding.

A study of the nature of grinding wheel wear indicates that the grinding wheel wear curve is similar to those of other cutting tools. It demonstrates further that the type of grinding operation significantly affects the nature of wheel wear. A unique technique has been developed for very accurately measuring grinding wheel wear. This measured wear may be translated into terms of "grinding ratio," which is the generally accepted parameter for measuring wheel wear. It is the ratio of the volume of metal removed per unit volume of wheel worn away.

Extensive studies have been carried out to determine the effect of mechanical variables on grinding ratio, power required in metal removal, and on surface finish. Experimental findings indicate that grinding ratio decreases with increased metal removal rate, and increases with workpiece diameter, decreased chip load and increased concentration of grinding fluid.

Power is found to increase with both the metal removal rate and the amount of metal removed. It increases slightly with workpiece diameter, and is affected little by work material hardness. Surface finish is found to improve with decreased metal removal rate and decreased chip load.

Fundamental research in the mechanics of wheel wear is supplying much additional information in the study of grinding wheel wear. The measurement of grinding forces employing a cylindrical grinding dynamometer provides the opportunity for relating the wear of grinding wheels to the basic mechanics of the process through such fundamental quantities as grinding forces, specific energy and grinding friction.

Two additional experimental techniques for the study of chip formation in grinding have also proved to be most useful research tools. A "quick-stop" apparatus is used to freeze the grinding action by accelerating a tiny workpiece almost instantaneously to grinding wheel speed. Another technique permits the comparison of the shape of the grinding grit and that of the contour of its path through the work by a unique replicating method.

\* \* \*

## Physical and Chemical Nature of Abrasive Wear

By GEORGE J. GOEPFERT

**Grinding has been defined as the process** by which abrasives are used to shape and generate new surfaces. Many abrasive materials are available and each functions at

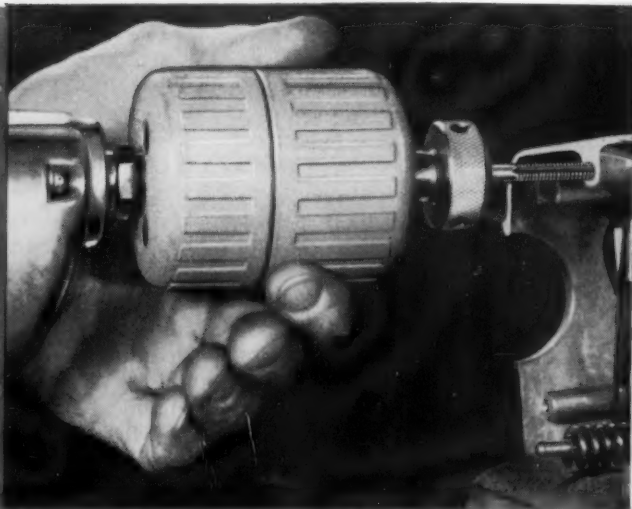


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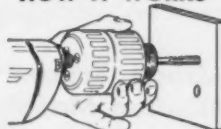
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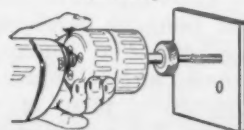
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## TAS Abstracts . . .

maximum efficiency only under certain specific conditions. An understanding of reasons for selection of an abrasive material for a grinding operation is the basis for efficient abrasive use.

This paper presents the technical reasons underlying the action of hard, refractory materials as abrasives in the grinding process. Initially, the discussion is from a chemical standpoint. Reasons are given for the use of special abrasives for metals, such as titanium, which are difficult to grind with conventional abrasives. A description of the effects of the various types of cutting fluids is included as part of the chemical aspects of abrasive wear. It is pointed out that selection of the most effective cutting fluid for

a grinding application is dependent upon an understanding of the chemical processes involved.

The contribution of physical properties of an abrasive to abrasive wear is also discussed. Laboratory tests are described which measure the resistance to wear in those systems in which chemical reactions are excluded. The results of these laboratory tests are correlated to grinding efficiency.

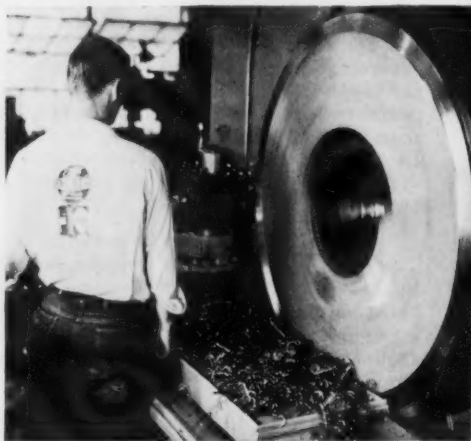
The research on the physical and chemical aspects of abrasive wear has led to an understanding of the properties needed in hard refractory materials for efficient abrasive action. Additional research is in progress along these lines as well as into the area of new materials. This work is directed towards the discovery of new and better abrasives which will contribute materially to better grinding wheels in the future.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

## Air-Gage Tracer Controlled Machining

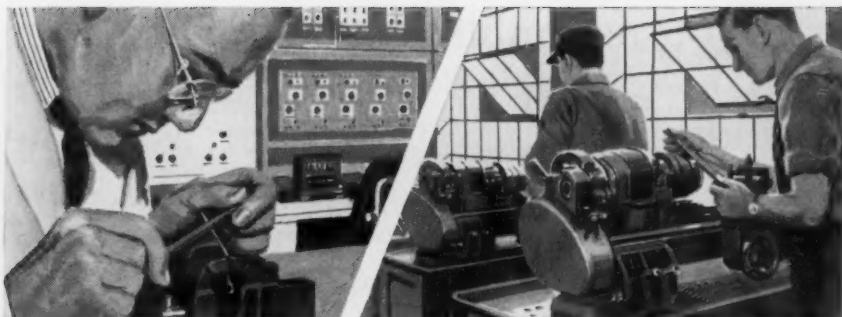
An enormous bearing bracket for a 1,500 h.p. induction motor is shown herewith receiving air-gage tracer controlled machining of its contoured surface at the Ridgeway, Pennsylvania, plant of the Elliott Company. Fabricated of S.A.E. 1020 steel, the 49¼-inch diameter workpiece demands a machining accuracy of plus 0.002 inch and minus 0.000 inch in turning, boring and back-facing cuts. Elliott meets this vital requirement in volume production runs, using carbide-tipped single point turning tools on a Monarch 60-inch right angle lathe.

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Contoured surface of huge bearing bracket for 1,500 h.p. induction motor is machined on tracer controlled right angle lathe.





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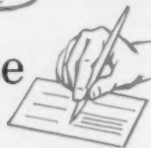
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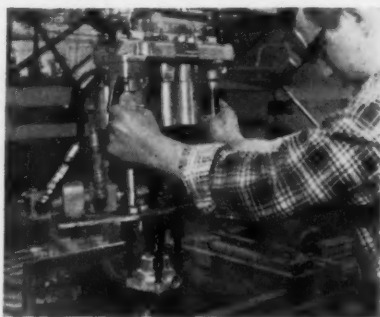
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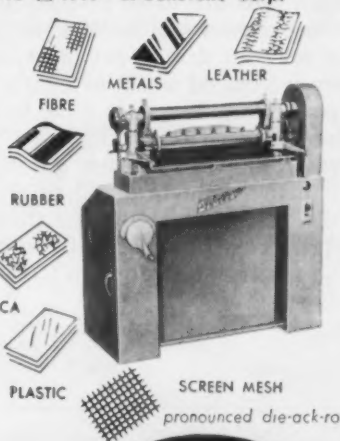
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## ideas from readers

*Several time-saving ideas and suggestions for the man in the machine shop.*

### Drilling Press-Fit Holes for Pins

By BUCKLEY SULLIVAN

**Wornout or broken drills have been found to provide an efficient means** for drilling holes into which pins are to be pressed-fitted. To use such a tool for this purpose, the wornout drill is cut off with an abrasive cut off wheel to such a size that the flute length is three to four times as long as the diameter. The end of the drill is then ground to an included angle of 50 to 60 degrees. Care is taken to see that the cutting edges of the drill are even. The result is a drill from 0.0005 to

0.003 inch or more undersize. (Since a new twist drill has a definite taper from the cutting end to the shank, the shortened twist drill is naturally undersize.)

To use the modified tool, a lead hole is first drilled in the workpiece, after which the shortened drill is used in order to bring the hole to the required size.

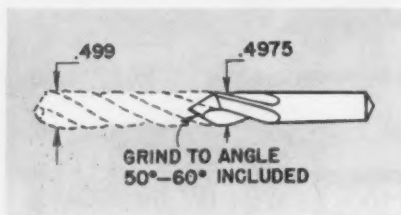
★ ★ ★

### Indexing Head for Tool Grinder

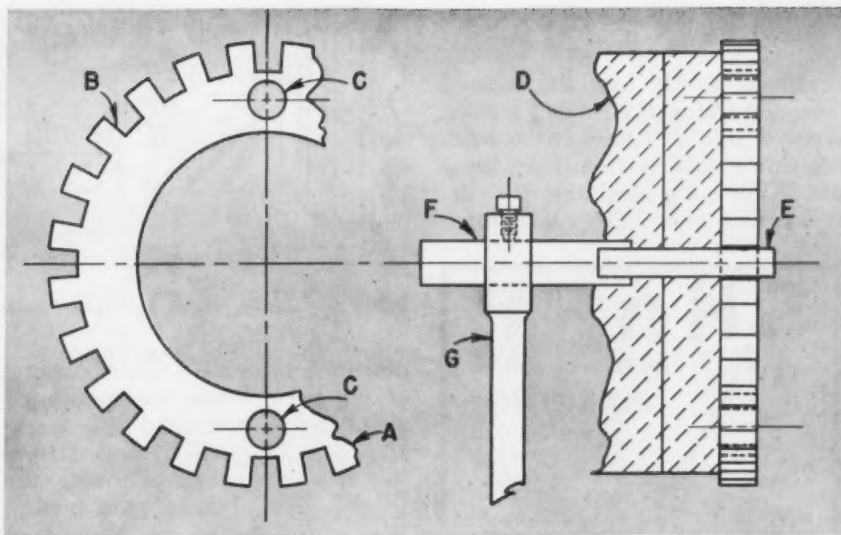
By ROBERT HILL

**The accompanying drawing shows an indexing head for a tool grinder** which was designed in our shop for use in grinding the flutes or reamers, taps, drills, and other cutting tools. This head can also be used for grinding flats on surfaces of many different types of work.

The indexing plate, A, is made of cold rolled steel of the proper diameter which, after being finished turned on a lathe, is milled on a



Sketch showing how worm twist drill can be shortened to provide for drilling of under-size holes for press-fitting pins therein.



*Drawing of indexing head for use on tool grinder in grinding flutes on cutting tools.*

milling machine to provide slots (24 in this case) of precisely the same width and depth, as shown at *B*. Two holes, *C*, are drilled in the index plate in order to accommodate flat head screws which are used in holding the index plate in a fixed position on the face of the workhead, *D*.

The index finger, *E*, which is designed to fit snugly in the slots of the index plate, can be arranged to suit the requirement of the user of the index head, inasmuch as several different finger setups are available. The drawing shows a finger setup wherein the finger, *E*, and the holder, *F*, is attached to a post, *G*, mounted on a table (not shown), resembling a finger setup for grinding the teeth of cutters. In another setup, the index finger can be positioned on top of the workhead.

## Fast-Releasing Stud Chuck

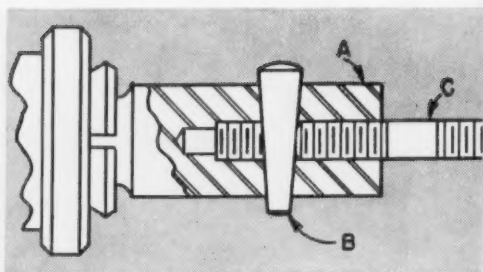
By H. J. GERBER

**For holding threaded workpieces**, such as studs, without damage to the threads while second operations are performed on the part, we designed the simple chucking device shown in the accompanying sketch. To make the device, a piece of round mild steel stock, *A*, is chucked in a lathe and the piece is faced off square at one end, following which a hole is drilled, bored and tapped in the piece at suitable depth from the squared endface. At right angles to this tapped hole, and at a proper distance from the end of the chuck, a hole is drilled and reamed to accommodate a standard taper pin, *B*.

To use the chuck, the taper pin

**ideas from readers . . .**

is driven tightly into the tapered hole and the workpiece, C, is then screwed into the threaded hole of the chuck until it strikes the taper pin. While being machined, the stud is forced tightly against the taper



Sketch of quick-releasing stud chuck.

pin, thus preventing any loosening of the part. When the machining operation is completed, the workpiece can be readily released from the chuck by simply driving the taper pin out of its hole and threading out the workpiece.

★ ★ ★

## Modified Tap Solves Tool Alignment Problem

By CLIFFORD MOLLOY

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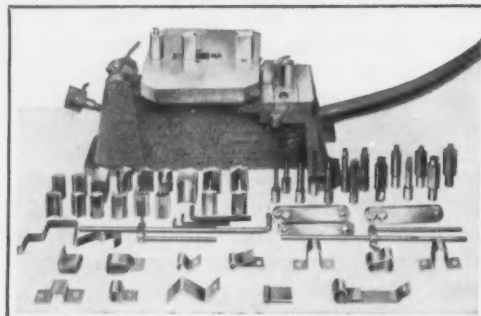
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## ideas from readers . . .



Modified tap designed to eliminate cutting of oversize threads at mouths of holes using machines having inaccurate alignment.

was experienced in maintaining accurate tool alignment, with the result that in tapping all but shallow holes, the tap cut oversize threads at the mouth of the hole.

We solved this problem by grinding away the back section of the cutting edges of the tap, as shown in the accompanying sketch. With this particular design, the tap follows the hole and the back section does not cut the threads oversize at the mouth of the hole.

★ ★ ★

**Grinding Wheel Simplified Practice Recommendation R45-57.** Published by Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio. 76 pages, 8½ by 11 inches. Single copies of recommendation available free on company letterhead request.

This edition supersedes the former 1947 edition and includes many major changes and improvements. Part I (Use Classification) lists standard shapes and sizes of grinding wheels classified according to end use; that is, cutting-off, cylindrical grinding, internal grinding,

and so on. Former editions have carried grinding wheel size recommendations for new machine design by listing them in bold type. The 1957 edition has segregated all of these shapes and sizes in this end use classification section. Now machine designers need only check this listing for the type of operation the machine is to perform in order to locate the standard grinding wheel shape and sizes that are available.

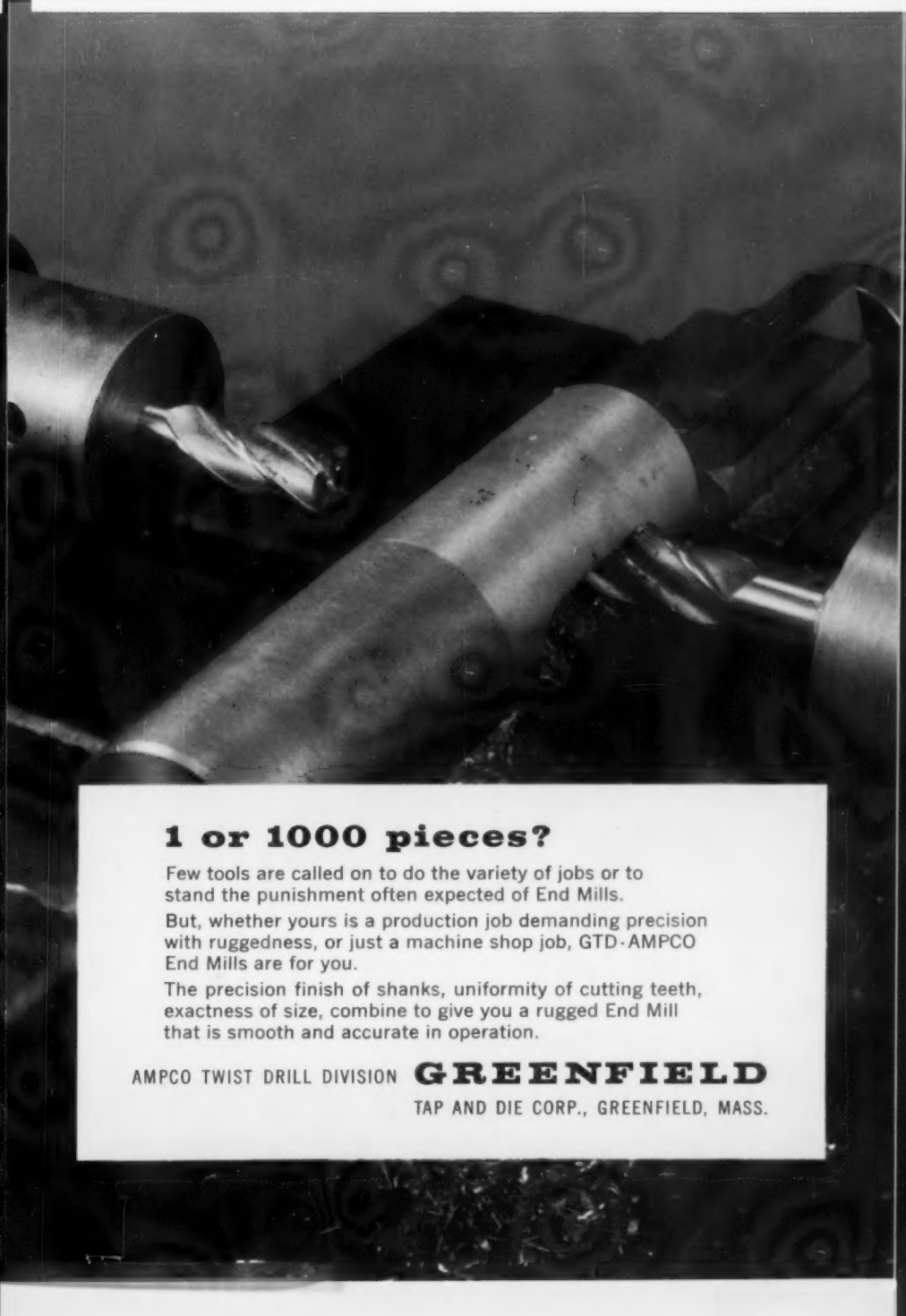
Part II (Standard Shape Types and Sizes) contains a complete listing of all standard sizes of grinding wheels available in each standard shape type. Six new basic grinding wheel shapes have been added; namely, Type 23, 24, 25, 26 and 27. A word description has been added for each standard wheel shape to clarify the line drawings.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



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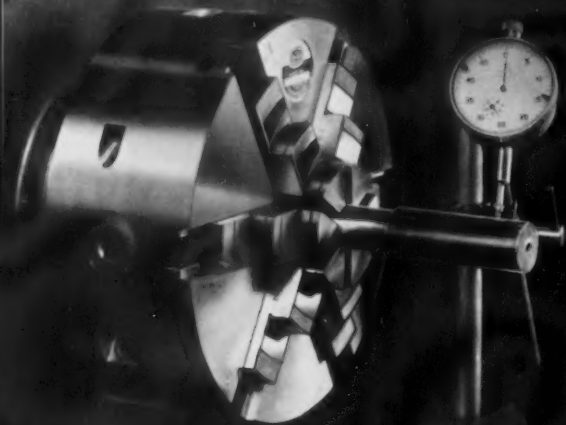
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## new literature

**Use Postpaid Cards opposite page 32  
and inside back cover for requesting  
free copies of literature listed below.**

### 1. Surface Grinder

Abrasive Machine Tool Co., East Providence, R. I. Capacities and weights of the Hydrabrasive No. 824, No. 1218, No. 1224 Surface Grinder.

### 2. Punches and Die Buttons

Acme Industrial Products, Inc., P. O. Box 468, Royal Oak, Mich. Ball lock interchangeable punches and die buttons, retainer plates and die sections.

### 3. Drill Bushings

American Drill Bushing Co., 5107 Pacific Blvd., Los Angeles 58, Calif. Delt-A-Grip, Hex-A-Grip or Serr-A-Grip Drill Jig Bushings.

### 4. Stainless Steel

Armco Steel Corp., Product Information Service, P. O. Box 2557, Middletown, Ohio. Corrosion resistance and high strength with 17-4 PH or 17-7 PH stainless steels.

### 5. Saws

Armstrong-Blum Manufacturing Co., 5700 Bloomingdale Ave., Chicago 39, Ill. Heavy duty Marvel Series 6 and 9 hack saws.

### 6. Tubing and Pipe

The Babcock and Wilcox Co., Tubular Products Division, Beaver Falls, Pa. Bending carbon, alloy and stainless steel tubing and pipe.

### 7. Honing Tools

Barnes Drill Co., 860 Chestnut St., Rockford, Ill. Slotted, flange, horizontal and the Barnesdril Plate Type Honing Tool.

### 8. Machinery Mounts

Barry Controls, Inc., 783 Pleasant St., Watertown 72, Mass. Leveling machinery mounts for making production machinery mobile.

### 9. Small Parts Case

Bay Products, Inc., 3015 N. 16th St., Philadelphia 32, Pa. Small parts cabinets and cases for use on benches, counters and in shelving for storage.

### 10. Carbide Tools

Besly-Welles Corp., South Beloit, Ill. Carbide tools, standard carbide blanks, lapped toss-away inserts, toolholders and so on.

### 11. Die Sets

E. W. Bliss Co., Cleveland, Ohio. Die-co all steel die sets, cast die sets and special die sets and J.I.C. pressroom standards for bolster plates.

### 12. End Mills

Brown and Sharpe Manufacturing Co., Providence, R. I. 2 inch diameter shank end mills have polished flutes and liberal rake angle.

### 13. Drilling Machine

Buffalo Forge Co., 388 Broadway, Buffalo, N. Y. Information available on the No. 15 drilling machine, taper and accessories.

### 14. Turret Drill

Burg Tool Manufacturing Co., Inc., 15001 South Figueora St., Gardena, Calif. Burgmaster Automatic Hydraulic Turret Drill is available in six and eight spindle models.



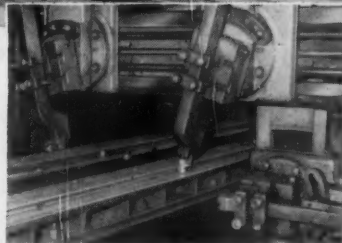


**Clamping Time  
Cut From 2.72  
To .08 Minutes**

## ...with **SUNDSTRAND** Magnetic Fixture

Prior to installing a magnetic fixture these long flat steel bars were held with 8 mechanical clamps. Total clamping and unclamping time was 2.72 minutes. After installing a Sundstrand magnetic fixture holding time was cut to .08 minutes, a savings of 2.64 minutes per piece over former method. In addition, the parts were pulled down flat for more accurate machining.

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### **15. Abrasive Machine**

Campbell Machine Division, American Chain and Cable, 931 Connecticut Ave., Bridgeport 2, Conn. Abrasive cutting machine for thin wall or heavy wall tube cutting.

### **16. Alloys**

Cerro de Pasco Sales Corp., 304 Park Ave., New York 22, N. Y. Current brochure—"63 Jobs You Can Do Better With Cerro Alloys."

### **17. Surface Equipment**

The Challenge Machinery Co., Grand Haven, Mich. Dove-tailed straight edges, magnesium and semi-steel straight edges, magnesium and semi-steel parallel straight edges and 3 point suspension surface plates.

### **18. Motor Units**

Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y. Multiple motor units and multi-spindle screw-drivers.

### **19. Industrial Wipers**

Chicago Rawhide Manufacturing Co., 1233 Elston Ave., Chicago 22, Ill. Detailed illustrated brochure on C/R Sirvene Industrial Wipe Wipers.

### **20. Grinding Wheels**

Cincinnati Milling Products Division, Cincinnati 9, Ohio. "Cincinnati Centertype Grinding Wheels" — features and applications.

### **21. Bending Press**

The Cleveland Crane and Engineering Co., 6449 E. 281 St., Wickliffe, Ohio. Steelweld bending presses for braking, forming, blanking, drawing, corrugating and punching.

### **22. Die Set**

Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill. Tolerances on the intricate shaft-mounted spring die set are plus 0.003 inch, minus 0.000 inch.

### **23. Oven**

Despatch Oven Co., 381 Despatch Bldg., Minneapolis 14, Minn. Information concerning the RS-5 Oven for hard baking operations at temperatures up to 600 degrees F.

### **24. Minute Man Broaches**

The du Mont Corp., Greenfield, Mass. 16-page catalog which lists 9 new stock sizes of both square and hexagon broaches, 3 new stock sizes of production-type keyway broaches plus a complete new line of standard stock round broaches.

### **25. End Mills**

Elgin National Watch Co., Abrasives Division, Elgin, Ill. Golden Circle Carbide End Mills.

### **26. Cost Reduction**

Equipto Division, Aurora Equipment Co., Aurora, Ill. "Short Cuts to Greater Profits."

### **27. Power Press**

Famco Machine Co., 3122 Sheridan Rd., Kenosha 10, Wis. Notching Z bars, punching side rails and crimping inserts or Famco power presses.

### **28. Straight Side Press**

Ferracute Machine Co., Bridgeton, N. J. Double crank straight side press has interconnected air clutch and brake.

### **29. Carbide Tools**

Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. Current data on carbide tools, tips and inserts.

### **30. Oil Groovers**

Fischer Machine Co., Eleventh and Wood Sts., Philadelphia 7, Pa. No. 1 oil groover cuts grooves in bearings up to 8 inches in length and up to 5 inches inside diameter.

### **31. Hydraulic Cylinder**

Flick-Reedy Corp., Miller Fluid Power Division, 2024 N. Hawthorne, Melrose Park, Ill. All Teflon sealed hydraulic cylinder.

### **32. Lathe Tooling System**

Fry Tool Manufacturing Co., Eaton, Ohio. Over 30 different types of adaptors; various models of toolholders; lathe stops.

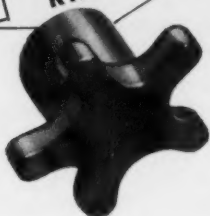
### **33. Maintenance Chart**

Gisholt Machine Co., Madison 10, Wis. Preventive maintenance charts in 22½ by 33½ inch wall size or 3-ring binder size.

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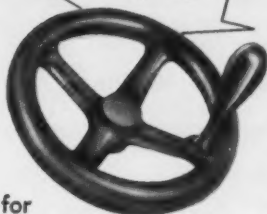
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**34. Table Feed Unit**

George Gorton Machine Co., 1710 Racine St., Racine, Wis. Electronic Dyna-Drive Table Feed Unit.

**35. Milling Machine**

Greaves Machine Tool Co., 2700 Eastern Ave., Cincinnati 2, Ohio. Standard and optional equipment and detailed specifications including speeds, feeds, table size, rapid traverse speeds and other essential facts.

**36. Bar Machine**

Greenlee Bros. and Co., 1890 Mason Ave., Rockford, Ill. Automatic bar machines hold each piece within required tolerances.

**37. Dust Collector**

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. Latest data on the Duskolector and Mistkolector in two models and four motor sizes.

**38. Hydraulic Presses**

Hannifin Corp., 565 South Wolf Rd., Des Plaines, Ill. Complete and latest line of hydraulic presses, air presses, power cylinders, directional air control valves and compressed air preparation units.

**39. Grinding Fixture**

Harig Manufacturing Corp., 5757 W. Howard St., Chicago 31, Ill. Grind-All Fixture for higher accuracy, greater range and maximum speed in grinding perforators.

**40. Gage Supplies**

Huron Machine Products, Inc., 6252 Monroe Blvd., Dearborn, Mich. Taperlock handles and blanks, thread ring gage blanks, thread ring gage holders, master setting disc blanks and insulating grips and so on.

**41. Vacuum Filter**

Industrial Filtration Co., 13 Industrial Ave., Lebanon, Ind. Information on the Filter-Matic Tubular Screen Vacuum Filter.

**42. Wheel Dressing Process**

Jones and Lamson Machine Co., 521 Clinton St., Springfield, Vt., and Koebel Diamond Tool Co., 9456 Grinnell, Detroit 13, Mich. Perpetual Form Control for Grinding Wheel Dressing.

**43. Carbide Alloys**

Kennametal, Inc., Latrobe, Pa. Heat-resistant titanium carbide alloys and their applications in metalworking.

**44. Double Angle Shears**

Kling Brothers Engineering Works, 1320 North Kostner Ave., Chicago 51, Ill. All sizes of Kling Double Angle Shears with special attachments to meet specific requirements.

**45. Lathe Chucks**

L-W Chuck Co., 28 South St. Clair St., Toledo 4, Ohio. Lathe chucks, magnetic chucks, dividing heads, demagnetizers, rectifiers, milling machine vises and power hack saws.

**46. Threading Heads**

Landis Machine Co., Waynesboro, Pa. Heat treated threading heads, both standard and special.

**47. Air and Vacuum Pumps**

Leiman Bros., Inc., 102 Christie St., Newark 5, N. J. Rotary positive air and vacuum pumps, gas boosters and air motors.

**48. Electrode Holder**

The Lincoln Electric Co., Dept. 3515, Cleveland 17, Ohio. Fully insulated, 300 and 400 ampere electrode holder.

**49. Centering Reel**

F. J. Littell Machine Co., 4163 Ravenswood Ave., Chicago 13, Ill. Supporting arms of centering reel are hydraulically expanded and variable speed motor controls automatically adjust pay-off speeds.

**50. Embossing Press**

Minster Machine Co., Minster, Ohio. Knuckle joint embossing presses for sizing, coining, embossing and similar applications.

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### **51. Gages**

Marcellus Manufacturing Co., P. O. Box 2, Belvidere, Ill. Cylindrical pin and thread plug gages, plain and thread ring gages, gage setting plugs, snap gages and master setting disks.

### **52. Chip Conveyor**

May-Fran Engineering, Inc., 1708 Clarkstone Rd., Cleveland 12, Ohio. Chip-Tote conveyor permits the continuous operation of machine tools by eliminating the down time for scrap removal.

### **53. Air Press**

Mead Specialties Co., 4114 N. Knox Ave., Dept. AA-97, Chicago 47, Ill. Air press has positive, exact depth stops.

### **54. Core Drills**

Metal Cutting Tools, Inc., 350 S. Water St., Rockford, Ill. Metcut two-piece core drills have sturdy pin mount design.

### **55. Drums**

Michigan Chrome and Chemical Co., 8615 Grinnell Ave., Detroit 13, Mich. Corrosion resistant drums coated with microssol.

### **56. Cut-Off Machine**

Modern Machine Tool Co., 2005 Losey Ave., Jackson, Mich. Automatic cut-off machines, automatic loaders, hot spinning machines and the safety drill table.

### **57. Subland Drills**

Mohawk Tools, Inc., Montpelier, Ohio. Subland drills available in a range of size-optional sizes and types.

### **58. Thread Rolling Head**

The National Acme Co., 183 E. 131st St., Cleveland 8, Ohio. Acme-Fette Series N, self-opening thread rolling head.

### **59. Self-Locking Bolts**

National Machine Products Co., Utica, Mich. Slotted-type and self-locking "place" bolts.

### **60. Setup Blocks**

Karl A. Neise, 404 4th Ave., Dept. MMS, New York 16, N. Y. Mermod setup blocks are adjustable in steps of 1/25 inch.

### **61. Milling Cutters**

O. K. Tool Co., 800 Elm St., Milford, N. H. Multidiam boring heads and milling cutters — tools that do up to eight and ten metal removing operations with a single stroke of the machine or one pass of the tool.

### **62. Power Bender**

O'Neil-Irwin Manufacturing Co., 306 8th Ave., Lake City, Minn. Di-Acro Hydra-Power Bender.

### **63. Socket Screws**

William H. Ottemiller Co., York, Pa. Alloy steel cone, oval flat and half-dog points socket screws.

### **64. Bending Machine**

Pines Engineering Co., Inc., 642 Walnut, Aurora, Ill. Information concerning bending machines for tubing, pipe, extrusions and rolled sections.

### **65. Gages**

The Pipe Machinery Co., 29105 Lakeland Blvd., Wickliffe, Ohio. Complete line of gages.

### **66. Drop Hammer**

Pneumatic Drop Hammer Co., 2000 Adams St., Braintree 84, Mass. Stationary anvil and double action drop hammer for cold sizing and planishing of stampings and small forgings.

### **67. Deep Hole Driller**

Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford, Conn. No. 1 1/2 Deep Hole Driller for drilling long true holes up to 2 inches in diameter.

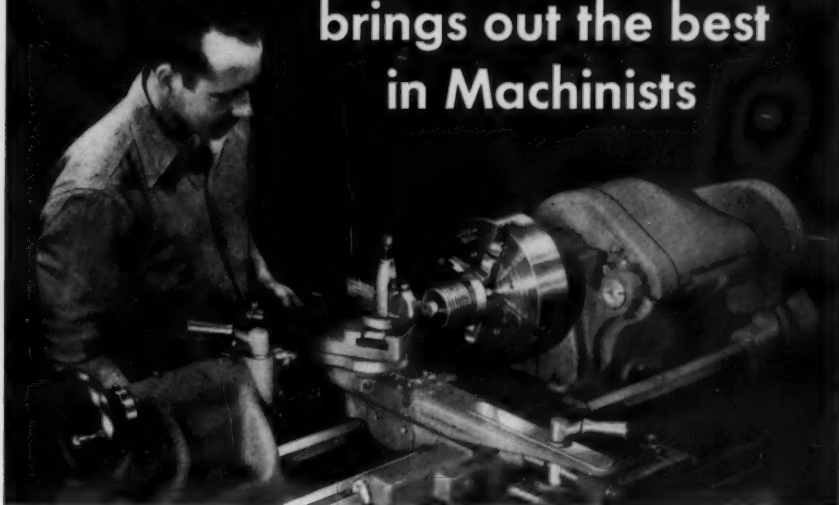
### **68. Tapping Unit**

Procurier Safety Chuck Co., 12 S. Clinton St., Chicago 6, Ill. "Tapp King" tru-grip tap holder permits tapping close to walls and shoulders.



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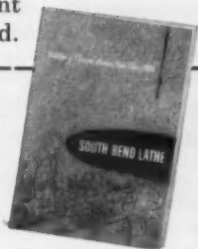
## SPECIFICATIONS

Swing—16¼" over bed  
Distance between centers  
—33" to 129" max.  
Collet Capacity—1"  
Spindle Speeds—6 to 16,  
20 to 980 r.p.m.  
Longitudinal feeds—48  
Cross feeds—48  
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to 224 per inch.

South Bend 16" Precision Lathes have long been popular with machinists for they help them do their best work. There's never a question of South Bend's accuracy . . . and their ease and speed of handling are incentives for additional production. When you want to produce top-notch work—efficiently—with low investment—set it up on a South Bend.

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### 69. Load Comparison Chart

The Producto Machine Co., 910 Housatonic Ave., Bridgeport 1, Conn. A load comparison chart covering three series of chrome-vanadium steel die springs.

### 70. Power Press

Sales Service Machine Tool Co., 2355 University Ave., St. Paul 14, Minn. Complete line of 2 to 85 ton Press-Rite O.B.I. Power Presses.

### 71. Micro Projector

George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. Micro projector for inspecting and measuring precision parts accurately, rapidly and economically.

### 72. Mechanical Presses

Service Machine Co., 2310 W. 7th St., Chicago 20, Ill. Open back, inclinable press, deep throat open back, inclinable press, deep throat press and No. 4 double crank gap press.

### 73. Pedestal Grinder

South Bend Lathe Works, South Bend 22, Ind. Drill press 7 inch shaper pedestal grinder.

### 74. Socket Screws

Standard Pressed Steel Co., Box 556, Jenkintown, Pa. Socket screws, pressure plugs and dowel pins.

### 75. Live Centers

Sturdimatic Tool Co., 3904 F St., Detroit 16, Mich. Engineered live centers are now available in "standards" and "specials."

### 76. Chuck Control Units

Sundstrand Machine Tool Co., Pneumatic Products Division, 1020-9th St., Rockford, Ill. Three types of control units in the new "Power-Grip" line for a range of applications.

### 77. Magnetic Chuck

The Taft-Peirce Manufacturing Co., Woonsocket, R. I. Superpower electromagnetic chuck does milling, shaping, profiling, layout, inspection, and holding odd-shaped work.

### 78. Tapping Attachment

Tapmatic Corp., 845 W. 16th St., Costa Mesa, Calif. Positive torque adjustment clutch stops tap instantly when tap becomes dull, loaded or bottoms in blind hole.

### 79. Multiple Nut Setting

Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill. Complete line of multiple spindle tools for increasing production and quality control and reducing operating costs in assembly processes.

### 80. Dust Collector

Torit Manufacturing Co., 296 Walnut St., St. Paul 2, Minn. Cabinet cloth filter dust collectors and cyclone separator type collectors.

### 81. Machine Tool Controls

True-Trace Sales Corp., El Monte 7, Calif. Controls for all types of machine tool users in aircraft, missile production, automotive, heavy industry and other fields.

### 82. Metalworking Processes

Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif. Cleaning, phosphating, conversion coatings, protective coating paint and carbon removing and descaling.

### 83. Machining Data

Verson Allsteel Press Co., 9300 S. Kenwood Ave., Chicago 19, Ill. Information relative to contract welding, machining, gear cutting and press rebuilding.

### 84. Machine Tools

Walker-Turner Division, Rockwell Manufacturing Co., Dept. WJ-22, 400 N. Lexington Ave., Pittsburgh 8, Pa. Complete information on band saws, circular saws, cut-off machines, drill presses, radial drills and grinders.

### 85. Engineering Data Sheet

Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. Grinding wheel recommendations for finishing overlays of hard-facing alloys.



**NOW! FROM HENDEY...**

## **all-new 32-speed geared-head lathes**

Here are the all-new Hendey No. 2013 and No. 2516 lathes, with an all-geared, 32-speed headstock, complete line-up of toolroom features, and heavy-duty design combined with toolroom precision.

**32 spindle speeds:** You quickly and easily select the speeds (from 18 to 2000 rpm) through two selector dials. Crowned, flame-hardened spur gears simplify design and reduce maintenance. You get maximum power for production work.

**66 feed and thread changes:** Quick-change spur gears, mounted on involute splines, are selected through two dials. Quick-change threads per inch range from 2 to 120. Feed range is from .0015 in. to .091 in. per revolution. There's an automatic overload release for the carriage feed. Load meter on the headstock tells the operator when he is taking full advantage of available power.

**Toolmaker features:** This lathe has them all: (1) multiple-thread indexing spindle, (2) built-in thread-chasing dial, (3) 66 threads, from 2 to 120 per inch, (4) reverse lever on apron, (5) automatic micrometer stops, (6) ball-thread-chasing stop on cross-feed screw, (7) hardened and precision-ground cross-feed screw and compound screw, (8) automatic, filtered lubrication to half nuts.

**New two-speed tailstock:** Compare these features with costlier lathes on the market: Weighing almost 400 lb, the tailstock still can be positioned quickly and easily with one hand. Ways under it are hardened and ground. Large 4½ in. diameter spindle has full 10 in. extension, with slow and rapid traverse speeds.

**Automatic spindle adjuster:** Spindle bearings never need adjusting regardless of operating speed. Three sets of super-precision tapered roller bearings support spindle at both ends and in the middle, improving accuracy and finish.

*Hendey* machine division  
BARBER-COLMAN COMPANY

114 Loomis St., Rockford, Illinois

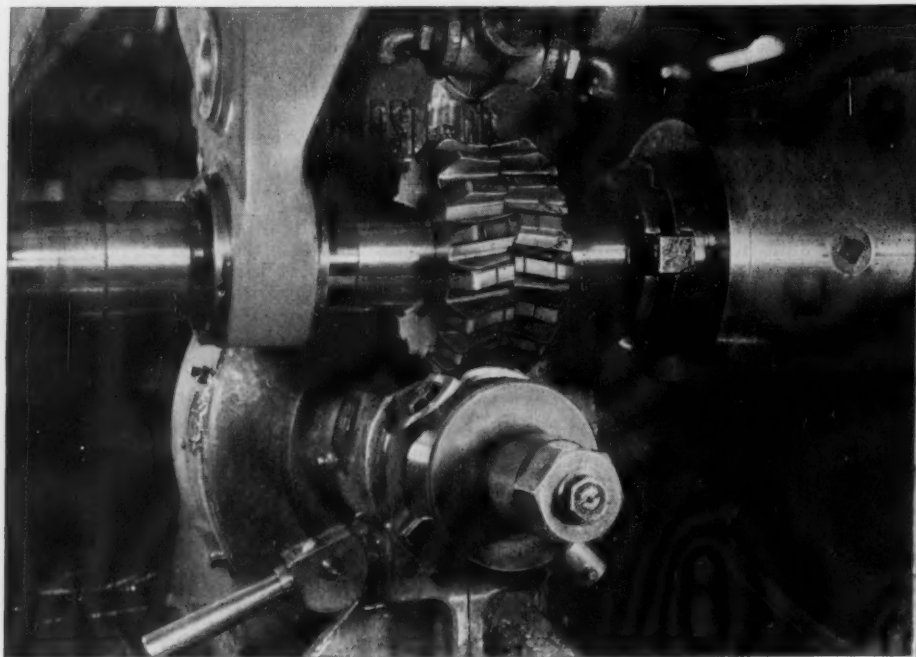


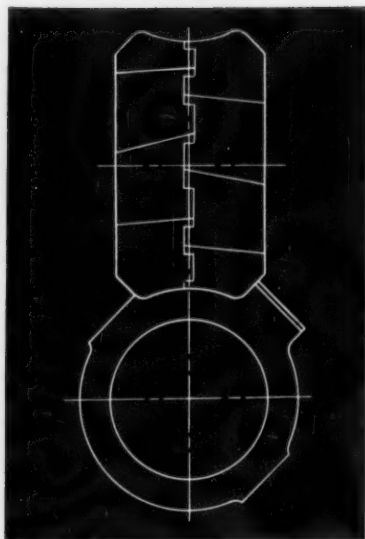
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*milling efficiency* \*  
*in tough steel calls for*  
*expert cutter design*

\* interlocking cutter with helical flutes  
in both directions provides positive cutting  
action in high alloy steel

\* ground form-relieved cutter provides  
required accuracy for this aircraft part

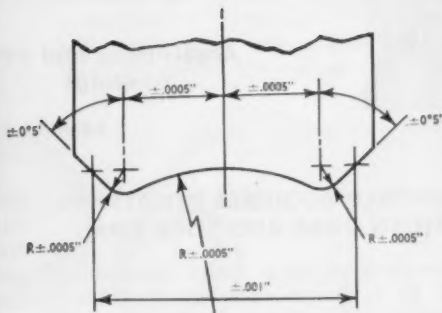




Accurate milling of this high alloy steel part for Sundstrand Aviation requires a combination of expert cutter design and precision cutter manufacture. To accomplish this job, Barber-Colman engineers designed a ground, form-relieved, interlocking cutter which is 6" in diameter.

Since the material is tough alloy steel for an aircraft part, the cutter is made in two interlocking sections so that each half of the cutter can have helical flutes in opposite directions. This design provides positive axial rake on the angular portion of each half of the cutter, resulting in a shearing action as each side enters the cut. In addition, the alternate tooth design provides maximum overlap for smooth cutting action and fine finish. A free flow of chips is obtained by the combination of the opposite-hand helical flutes and the alternate teeth.

The form on this cutter is ground to hold the close tolerances required on the part. Each of the radii is held to a tolerance of  $\pm .0005''$ . The width of each half from the center of the radius



Cutter Tolerances

to the center of the cutter is held to  $\pm .0005''$ , with an overall tolerance of  $\pm .001''$  when the cutter sections are assembled. The form must fit the layout within  $.0005''$ , and this tolerance is inspected to include the effect of axial and radial runout. Accurate tolerances such as these can be provided for your parts by Barber-Colman ground form-relieved cutters.

A fine finish is obtained using a feed of .980 inches per minute and a speed of 80 SFM. The tolerance for finish is 125 RMS. Approximately 200 inches of this tough steel are milled per sharpening.

Results like these are evidence that when you are milling tough materials requiring accuracy and finish, expert cutter design and manufacture are essential for cutting efficiency and good tool life. Consult Barber-Colman cutter engineers on your milling cutter requirements. Their long experience and manufacturing knowledge can save you production time and costs.

## BARBER-COLMAN COMPANY

8611 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines



For more data circle 433 on Reader Service Card

November, 1957

modern machine shop 177

Albert E. McNamara, George F. Powell and William S. Joyce, who will

service offices in the United States and Canada, and foreign manufacturing, sales and service facilities in

## news of the industry

**Acquisitions and expansions . . . awards  
. . . meetings . . . new appointments.**

Edited by R. M. SCHIFFER

### **SHEFFIELD ACQUIRES INTEREST IN BRITISH GAGE AND TOOL FIRM**

Acquisition of a major interest in M. P. J. Gauge and Tool Co., Ltd., Birmingham, England, producer of special high-precision fixed gaging equipment and dial indicator instruments, by The Sheffield Corporation, Dayton, Ohio, has been announced by Louis Polk, president of Sheffield, a subsidiary of Bendix Aviation Corp.

Immediate expansion of the M. P. J.

plant facilities at Birmingham is scheduled, under a program which eventually will enable the British company to manufacture and sell all Sheffield products in the English market. Initially, production will include the wide variety of Sheffield's standard production instruments division.

The M. P. J. Gauge and Tool Co., (which will continue to make and sell its present line of products) was established in Birmingham in 1937, by



Partial view of the M. P. J. Gauge and Tool Co., Ltd., plant in Birmingham, England



Albert E. McNamara, George F. Powell and William S. Joyce, who will continue its management as a Sheffield subsidiary.

★ ★ ★

## IBEC PURCHASES BELLWS COMPANY

An announcement was recently made that The International Basic Economy Corp. (IBEC) of New York has purchased the Bellows Co., Akron, Ohio, and its various affiliated companies and divisions.

Bellows manufactures pneumatic, hydraulic and electrical equipment for automated production in practically every industry. Its affiliated company, Pneumatic Products Co., has plants in Akron, Union, N. J., and Warsaw, Indiana. Bellows' Smith-Johnson Division operates a plant in Glendale, Calif., and Bellows' Pneumatic Devices of Canada has a plant in Toronto.

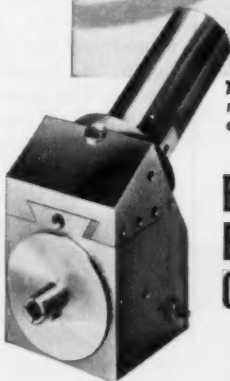
Bellows also makes pneumatic lubricating equipment at Grand Rapids, Mich., and neon and zeon signs in Akron. There are eighty sales and

service offices in the United States and Canada, and foreign manufacturing, sales and service facilities in Birmingham, England; Geneva, Switzerland; and Milan, Italy.

It was stated that no change is contemplated in the management of The Bellows Co. Bellows will operate as a division of IBEC and H. B. Link will continue to direct the management policies of the company.



Typical screw machine parts now being marked on the end face during machining cycle by series 900 automatic roll markers.



New series 900  
Automatic roll marker

Write today  
for  
Bulletin 900

## ELIMINATE SECONDARY END-FACE MARKING OPERATIONS

*Save with New Method  
Automatic Roll Markers*

- For screw machines and other multiple-station machines
- Flat or angular surface marking
- Extremely accurate—operate on same centers as part being machined.
- Mark any material to adjustable depths
- Standardized by proven performance



**NEW METHOD STEEL STAMPS INC.**

147 JOS. CAMPAU • DETROIT 7, MICH.

For more data circle 434 on Reader Service Card

November, 1957

modern machine shop 179

*Lightning fast*



*Now Available...*

FOR YOUR CONVENIENCE

**Miccro**  
*Supreme Spray***LAY-OUT DYE**  
(Purple)

A new, easy-to-use, dependable, spray Lay-Out Dye for tool, die, pattern, or template layout on metal. Dries instantly—shows up in sharp relief.

*Also Still Available...***Miccro**  
*Supreme***LAY-OUT AND  
IDENTIFICATION  
DYE (7 Colors)**

For layout on metal and quick identification of bar stock, sheets, strips, or parts. Also dries instantly and shows up in sharp relief. Available in brush-in-cap cans and larger containers.

Write for circular on  
company letterhead.

**MICHIGAN CHROME &  
CHEMICAL COMPANY**

8615 Grinnell Ave. • Detroit 13, Mich.

For more data circle 435 on Reader Service Card

180 modern machine shop

**news of the industry . . .**

IBEC, an international finance and development firm, is engaged in numerous activities in Latin America, ranging from supermarkets and soluble coffee to low cost housing and investment and finance. It also has enterprises in Canada, Italy, West Germany, Puerto Rico and Thailand. In this country, IBEC's V. D. Anderson Division, Cleveland, manufactures oil extraction machinery.

★ ★ ★

**ELLSTROM STANDARDS DIVISION  
DEVELOPS INSPECTION  
CERTIFICATE**

Ellstrom Standards Division, Dearborn Gage Co., Dearborn, Mich., has announced the development of a certificate of inspection form for gage blocks. The form is furnished by Ellstrom to all purchasers of new certified gage block sets, and to any company using their gage block inspection service, to provide such companies with a detailed report on the specific accuracy of every block inspected.

The form not only supplies gage block users with a permanent record of the deviation from normal size, in millionths of an inch, for every gage block inspected—but includes errors in parallelism and flatness which exceed the specified tolerances for each, a record of the serial numbers of all blocks which do not match the series numbers of the set being inspected, plus a notation of recommended replacement for all blocks which do not fall within specified accuracy limits.

If a one-inch working accuracy gage block is found to be minus 9 millionths of an inch from nominal dimension on its measured length, a notation is made on the form by Ellstrom inspection engineers under "Recommended

November, 1957

# Lightning fast speed change

**a money making virtue!**

This time saving feature of "AMERICAN" Pacemaker Lathes appeals strongly to operators who acclaim it a real money maker for them.

The speed plate is direct reading and shows at a glance the available spindle speeds and how to secure them. Operators can't go wrong. So fast, so easy to read and so simple that they do not hesitate to make speed changes to secure correct cutting speeds.

In addition, cutting speed snap-on plates are available indicating the lever positions for cutting various work diameters at the selected feet per minute cutting speed. These plates may be quickly applied and changed for the desired cutting speed.

No system for securing cutting speeds could be simpler, faster or less expensive in first cost and maintenance.

- These and other fine features of the "AMERICAN" DeLuxe Model Pacemaker are illustrated and described by Bulletin No. 116.

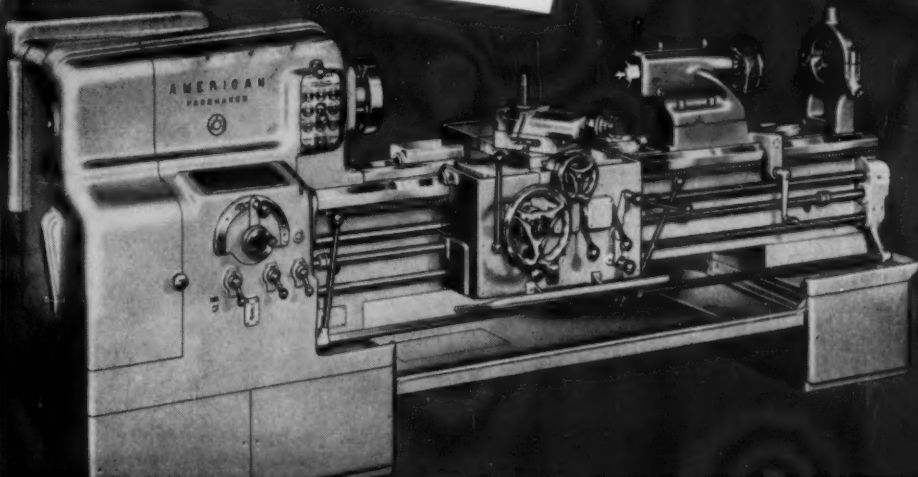
SPINDLE SPEEDS  
R.P.M.  
LEVER POSITIONS

30	36	42
130	150	178
550	650	760
48		60
210		1230
890		
80	94	110
340	400	470
1450	1700	2000
CENTRAL	56	POSITION
	244	
	1050	

Spindle  
(Dial)

150 F.P.M.  
CUTTING SPEED  
LEVER POSITIONS

19%	15%	13%
4 1/2	3 1/2	3 1/2
1 1/2		1/2
12		8 1/2
2 1/2		2
7 1/2	6 1/2	5 1/2
1 1/2	1 1/2	1 1/2
1/2		
CENTRAL	10%	POSITION
	2 1/2	
	7 1/2	



**THE AMERICAN TOOL WORKS CO. Cincinnati 2, Ohio, U. S. A.**

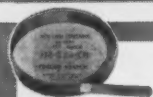
**LATHES AND RADIAL DRILLS**

**NEW!**

## SPECIFY TOP QUALITY



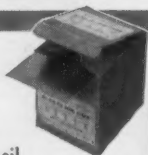
**ARBOR SPACERS  
SHIMS and SPACING COLLARS** • Arbor Spacers and Shims in 20 sizes and thicknesses from .001" to .125". Arbor Spacers furnished with standard keyway; Shims, with no keyway. Also Spacing Collars in numerous popular diameters, and in thicknesses from  $\frac{1}{8}$ " to 3". Hardened and ground; edges chamfered. Furnished with standard keyway.



**FEELER STOCK** • Made from tempered stock, rolled to close tolerances,  $\frac{1}{8}$ " x 25' coils packaged in transparent plastic boxes, except above .020". Strips  $\frac{1}{8}$ " x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)

### SHIM STOCK •

Steel or brass. Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses, .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in two assortment packages—12 thicknesses, .001" to .015", and 15 thicknesses, .001 to .032".



WRITE FOR

Illustrated Brochure  
and Price List!



## DETROIT STAMPING CO.

349 MIDLAND AVE., DETROIT 3, MICHIGAN

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182 modern machine shop

## news of the industry . . .

Replacements"—since industry standard tolerances for working accuracy blocks are plus or minus 8 millionths of an inch. The same would hold true for excessive variations in parallelism and flatness.

★ ★ ★

### "THE STORY OF MEASUREMENT," TRAVELING EXHIBIT

Arrangements are currently being scheduled for engineering and technical societies for "The Story of Measurement," a traveling exhibit which is now beginning its second season on the road. Prepared by the Wilkie Foundation of Des Plaines, Illinois, in cooperation with leading museums and universities, "The Story of Measurement" is the second in a series of exhibits created to portray the improvement of man's material welfare through the use of tools. The first of this series, "Civilization through Tools," describes the evolution of tools as used to change the shape of natural materials.



Illustration showing the display panels revealing "The Story of Measurement"

November, 1957



# NEW!

## GREIST MICRO-SCRIBERS® mark hard metals fast!



### Now in 2 sizes... Heavy-Duty and Slim-Line

**Solid carbide tip stays sharper, longer!** Scribes fine lines on hardened steel, ceramics, plastics, gems, glass.

**Diamond lapped** to correct tip angle that gives you fast, easy, close-tolerance layouts.

Hexagonal aluminum body—anodized for extra protection. Packaged in clear "plastic bubble" that protects precision tip.

Order a half-dozen from your Greist distributor today! Specify **Heavy-Duty** or **Slim-Line**. Only **\$1.00** each.

**THE GREIST MANUFACTURING COMPANY**  
4911 Blake Street, New Haven 15, Connecticut  
Precision Products since 1871

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HEAVY-DUTY

## news of the industry . . .

Now, through the use of three-dimensional display panels, and full color, cinemascope type slides, "The Story of Measurement" portrays the development of measurement standards, techniques and instruments used to control the quality of work done by material shaping tools.

A lecture given by Mr. C. G. Schel-

ly, noted scientist, inventor and author, explains in easy to understand language, "interferometry," the method used to establish the accuracy of our present day standards — gage blocks, and how this accuracy is maintained by regular inspection and calibration in the shop. Mr. Schelly explains the advantages gained by using gage blocks as working gages in the Micro-Step Gaging System; thereby bringing the accuracy of light even

closer to the production line; perhaps some day, light itself may be the measuring medium for industry.

"The Story of Measurement" which makes abundantly clear the reasons why dimensional quality control through the science of precision measurement, is sponsored and made possible by The Do-All Company, manufacturer of metal cutting band sawing machines, precision surface grinders, precision measuring instruments, cutting tools and other industrial equipment. The exhibit is touring the Central and Eastern states during the 1957-1958 season. Tentative plans for 1958-59 are to cover all the western states.

## GREEN ENGRAVERS *are fast!*

- Spindle speeds up to 26,000 rpm to engrave or for machining modern materials
- Fastest possible copy set-up
- Greatest ease and speed of adjustments
- Cutter grinders, rotary tables, master letters, compound slides, name plate blanks and all required accessories

### MODEL D2 HEAVY-DUTY 2-DIMENSIONAL

- 575 pounds-rigid, sturdy, precise
- Vertical adjustment of copy table automatic with Pantograph
- Unobstructed on three sides to take large work
- Vertical range over 10 inches
- Micrometer adjustment for depth of cut
- Ball bearing construction throughout — super precision ball bearings in spindle
- Ratios 2 to 1 to infinity — master copy area 26" x 10"



### MODEL 106 PORTABLE BENCH MODEL- 2- OR 3-DIMENSIONAL

- 40 pounds of unbeatable speed and accuracy at a reasonable price
- Perfect for all machining applications within its range
- Ball bearing spindle has three speeds up to 14,000 rpm
- 5 positive, accurate pantograph ratios
- One copy carrier (supplied) accepts all master sizes
- Height of pantograph and position of cutter are continuously adjustable
- Work up to 10" by any width
- Taper shank cutters



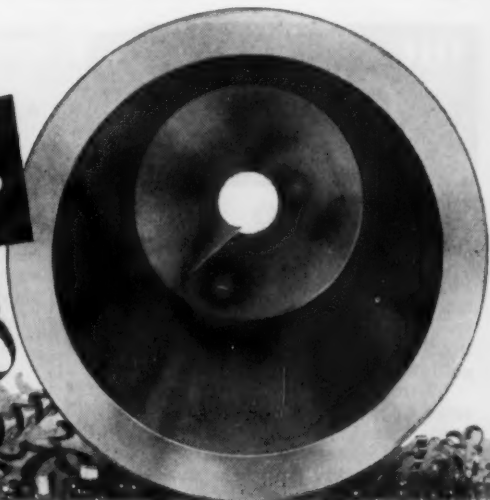
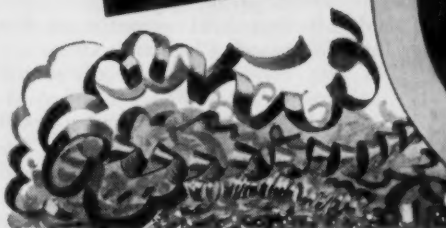
**GREEN INSTRUMENT CO., INC.**

392 Putnam Avenue Cambridge, Mass.

For more data circle 439 on Reader Service Card



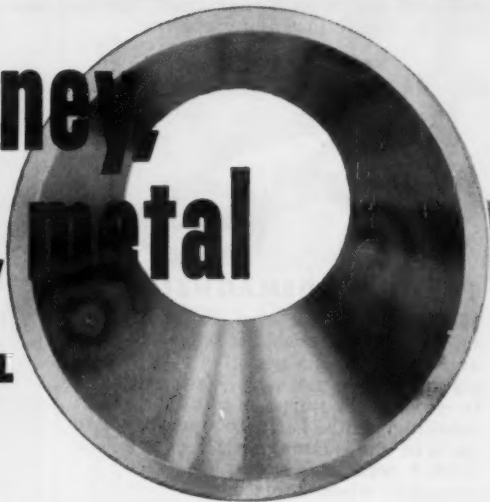
what price  
WASTE?



save money,  
minutes, metal

with  
**B&W MECHANICAL  
TUBING**

CARBON • ALLOY • STAINLESS



Countless hollow parts and products now being made from solid stock can be fabricated more economically from tubing. The hole is there, eliminating heavy drilling with all its attendant waste. And the wide range of sizes, shapes, analyses, finishes and heat-treated conditions in which B&W Mechanical Tubing is available, make it a semi-finished product in itself — reduce all your machining operations to the minimum.

Get the facts on savings from Mr. Tubes, your link to B&W and your local B&W tubing distributor.

Write for Guide to the Use of Seamless Mechanical Tubing, Technical Bulletin 340.

The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



TA 5031-MI

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

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#### FORGING DIE INSERT

Material: Heppenstall 'A'  
Conventional Machining

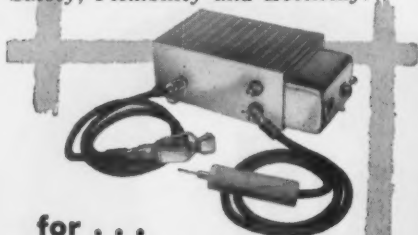


### for . . . **PRODUCTION SOLDERING**

Handles numerous soldering jobs from fine precision to medium-heavy industrial. More than 16 styles of electrode holders to fit individual soft or hard soldering operations.

From 6 to 30 stages of heat with a selector switch used in conjunction with 3 secondary terminals.

A wide range of power—5 to 2500 watts—quickly supplies concentrated heat at exact area—insures perfectly soldered joints with maximum Speed, Safety, Flexibility and Economy.



### for . . . **ETCHING & DEMAGNETIZING**

Marks the hardest steel, stainless steel, steel alloys or carbides with the ease and legibility of a pencil. 4 types of interchangeable marking points available to serve every purpose. 6 to 36 distinct marking heats. Easy to operate. Two tools in one. Demagnetizes over a 4 to 8-inch width. Especially valuable when tools have been in contact with magnetic chuck.

Write for New Catalog descriptive of all model Solder Tools, Etch-tools, Demagnetizers . . . today.



**THE LUMA  
ELECTRIC  
EQUIPMENT CO.**

P.O. Box 132-M5 • Toledo, Ohio

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186 modern machine shop

## news of the industry . . .

### A.M.T.D.A. ELECTS OFFICERS

The American Machine Tool Distributors Association announced the election of Frank H. Habicht, president and general manager of Marshall & Huschart Machinery Co., Chicago, Ill., as president at its Thirty-Third Annual Meeting held recently at the Hotel Cleveland, Cleveland, Ohio.

It was revealed that this was the first time in the history of the A.M.T.D.A. that both a father and son will have served as president of the organization. George Habicht, Jr., served as president in 1946-47.

Among the other officers elected to new positions at the meeting were: J. O. Ellison, who became first vice presi-

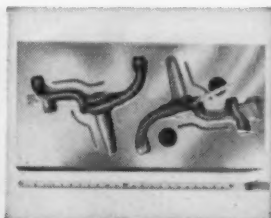


Frank H. Habicht, president (upper left); J. O. Ellison, first vice president (upper right); J. Russell Clark, second vice president (lower left); and George E. Merryweather, secretary-treasurer (lower right)

November, 1957

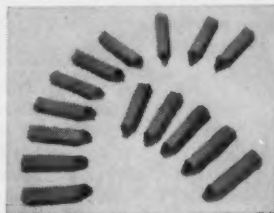
## FORGING DIE INSERT

Material: Heppenstall 'A'  
Conventional Machining  
Time: 76 hours  
Elox Setup & Machining  
Time: 45 hours  
Saved: 31 hours  
Machine tool: Elox M-501 DieMatic  
Electrode: Cast Elo-met  
Customers report 50% saving on new forging dies and 75% savings in reworking dies.



## TUNGSTEN CARBIDE SINGLE POINT TOOLS

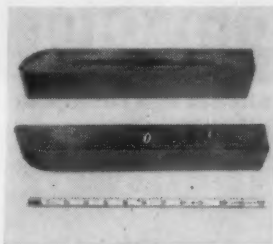
E D M produces 14 identically machined tools per hour. Times include roughing and finishing, machining both faces, nose radius and top. Radius held to  $\pm .001$ ". Tools were produced by 1 man operating 2 Elox Tool & Cutter Grinders, using a brass wheel. Users report Elox ground tools give greatly increased life when compared to abrasive ground tools.



## EMBOSSING DIE

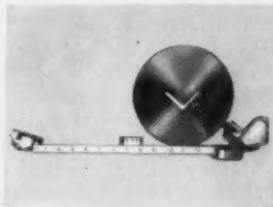
Material: Air Hardened Tool Steel  
Die consists of 1,250 squares machined .100" x .030" deep in the bottom section of the die. Sharp corners on each square had to be maintained.

Conventional Machining  
Time: 227 hours  
Elox Setup & Machining  
Time: 10 hours  
Saved: 217 hours  
Machine Tool: Elox Standard M-500  
Electrode: Free machining brass



## EXTRUSION DIE

Material: Air Hardened Tool Steel  
Conventional  
Machining Time: 4 hours  
Elox Setup &  
Machining Time: 1 hr. 38 min.  
Saved: 2 Hrs. 22 min.  
Machine Tool: Elox Standard M-500  
Electrode: Free machining brass  
Machining is done after final heat treating . . . eliminating the possibility of distortion.



FROM  
THE  
HEART  
OF

EDM



... 4 jobs  
that prove

Elox  
puts you  
ahead of  
competition

These jobs were done for Elox customers in our "Prove It" Division. There's more to them than just "man hours" saved. The Elox sales engineer in your area would like to give you all the details about these and other applications of Electrical Discharge Machining. Why not write . . .

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EST. 1942

1839 N. Stephenson Highway  
Royal Oak 3, Michigan

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November, 1957

modern machine shop 187



**FORM-TRUE Grinding Wheels**

**TO "TENTHS" ACCURACY IN MINUTES!**  
Form complex grinding wheel shapes in minutes . . . re-true same shape as often as required. You'll produce better dies, punches, form tools etc. in hours instead of days. Light, portable, easy to use . . . and available in the right size and type for your form-grinding machine. Write now for complete information.

 **diaform** **WHEEL FORMING ATTACHMENTS**

For more data circle 443 on Reader Service Card

★ ★ ★ ★ ★

### news of the industry . . .

dent; J. Russel Clark, second vice president; and George E. Merryweather, secretary-treasurer. Mr. Ellison is president of Harron, Rickard & McCone Company of Northern California. Mr. Clark is president of the White Star Machinery & Supply Company, Inc., Wichita, Kansas. Mr. Merryweather is vice president and secretary of The Motch & Merryweather Machinery Company, Cleveland, Ohio.

★ ★ ★

### UNDERGRADUATE ENGINEERING AWARDS

Engineering Undergraduates in twenty-six engineering schools and universities received recognition and

awards this year in the annual competition sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, for student designs of welded machines and structures. A total of forty-six awards amounting to \$5,000 were given to engineering undergraduates. Duplicate awards in scholarship funds were presented to schools honoring the students whose designs received the main awards. Awards were made for papers submitted to The Lincoln Foundation presenting designs of machines and structures improved through the use of welded design.

The First Grand Award of \$1,250 went to a husband and wife engineering team, Charles and Ann Hutchins who as undergraduates at the University of Michigan, collaborated to submit an entry on the design of various parts used in a welded two-stage press.

Ann was enrolled in the College of Architecture and Design; Charles was in the Mechanical Engineering Department. Their departments were each given \$500 in scholarship funds honoring their achievement. In the ten-year history of the Lincoln Foundation competition, this is the first year a woman has received recognition among the generally predominate male engineering undergraduates.

Another team received the \$1,000 Second Award. Eugene A. Jahnke of Charles City, Iowa, and Keith Wilson of Monroe, Wisconsin, both enrolled in the Department of Architectural Engineering at Iowa State College, designed a welded rigid steel frame to be used in an elementary school building. Their department received in their honor scholarship funds of \$500.

The Third Award went to Donald Malcolm of Pittsburgh who as a student in the Machine Design Depart-

ment of Cornell University, designed a machine for handling work for automatic welding. He received \$500 and his department was given \$250 to award in scholarships.

★ ★ ★

## ADVERTISING COMPETITION AWARDS

Six machine tool companies recently received awards in this year's Advertising Competition sponsored by the Advertising and Marketing Research Committee of the National Machine Tool Builders' Association. The award certificates were presented to the winning companies at the Association's Annual Meeting at the French Lick-Sheraton Hotel, French Lick, Indiana. A total of 65 entries in the competition were received from 41 companies.

The judging was done in Cleveland. The judges were Nevin K. Brothers,

★ ★ ★ ★ ★



## MILLING CUTTERS

*A Complete Line of the  
Highest Quality*

Whatever your needs, you can get the right standard or special milling cutters to do the job better from one convenient source . . . Pratt & Whitney. Like all other P&W Cutting Tools, you can be sure they'll cost you less in the long run . . . because they run longer! Write now for complete information. Pratt & Whitney Company, Inc., 25 Charter Oak Boulevard, West Hartford, Conn.

AVAILABLE FROM  
STOCK AT THE P&W BRANCH OFFICE NEAR YOU



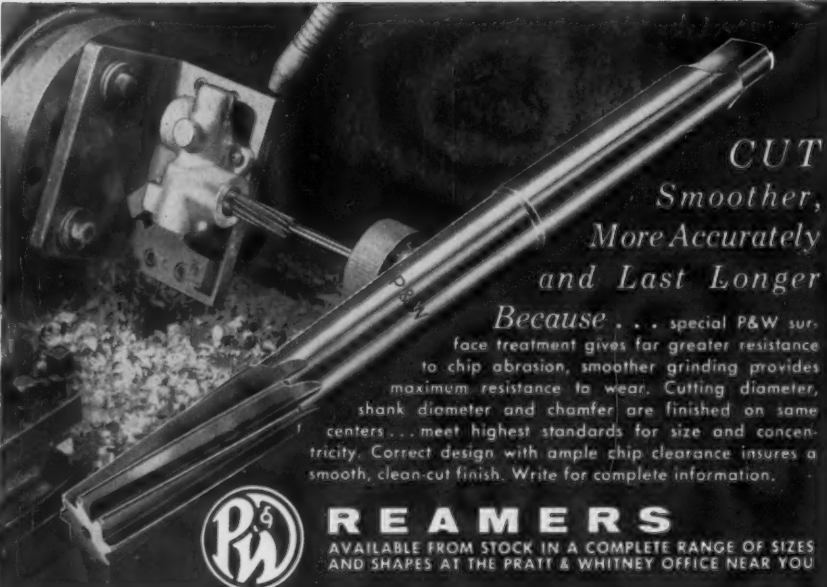
## PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY  
MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 444 on Reader Service Card


tomers are offered a solution to their pipe and tubing fabrication problems

Shel, a leading producer of special lightweight locknuts used in missiles



**CUT**  
Smoother,  
More Accurately  
and Last Longer

Because . . . special P&W surface treatment gives for greater resistance to chip abrasion, smoother grinding provides maximum resistance to wear. Cutting diameter, shank diameter and chamfer are finished on same centers . . . meet highest standards for size and concentricity. Correct design with ample chip clearance insures a smooth, clean-cut finish. Write for complete information.

 **REAMERS**  
AVAILABLE FROM STOCK IN A COMPLETE RANGE OF SIZES AND SHAPES AT THE PRATT & WHITNEY OFFICE NEAR YOU

For more data circle 445 on Reader Service Card

★ ★ ★ ★ ★

### news of the industry . . .

works manager, Towmotor Corporation, Cleveland; Arthur E. Burdge, president, Direct Mail Advertising Association, Inc., New York City; Karl H. Meyer, manager of manufacturing service, Reliance Electric and Engineering Company, Cleveland; and Richard K. Skidmore, consulting mechanical engineer, Cleveland.

The three categories in the contest for which the awards were made and the winning companies are as follows: Category #1 — a series of three or more direct mail pieces. First: Denison Engineering Division, American Brake Shoe Company, Columbus, Ohio. Honorable Mention: The Cincinnati Milling Machine Company, Cincinnati, Ohio. Category #2 — a single direct mail piece prepared for

a special purpose. First: Van Norman Machine Company, Springfield, Massachusetts. Honorable Mention: The R. K. LeBlond Machine Tool Company, Cincinnati, Ohio. Category #3 — an external house organ. First: E. W. Bliss Company, Canton, Ohio. Honorable Mention: The Cincinnati Milling Machine Company, Cincinnati, Ohio, and The Heald Machine Company, Worcester, Massachusetts.

★ ★ ★

### VOGEL TOOL AND DIE EXPANDS OPERATIONS

Vogel Tool and Die Corp., Melrose Park, Ill., has recently expanded its operations to include a fully equipped fabricating department to provide a more complete service in meeting the pipe and tubing fabricating requirements of its customers. Here the cus-



tomers are offered a solution to their pipe and tubing fabrication problems through low cost tooling as well as low cost production rates. This applies not only to cutting and notching but also to piercing, flaring, slotting, bending and many other types of operations for which equipment is readily available.

★ ★ ★

### STANDARD PRESSED STEEL ACQUIRES NUTT-SHEL CO.

The Nutt-Shel Co., Glendale, Calif., has been acquired by Standard Pressed Steel Co., Jenkintown, Pa., manufacturer of precision industrial and aircraft fasteners and steel shop equipment. Acquisition was made through the exchange of 28,574 shares of SPS stock for all the capital stock of Nutt-

Shel, a leading producer of special lightweight locknuts used in missiles, electronic apparatus, aircraft, fuel tanks and related products.

The Nutt-Shel line of fixed and floating anchor nuts, dome nuts, gang channel and bolt retainers complements the line of standard hexagon locknuts made by SPS. The company also expects to benefit from the interchange of technical know-how between the two organizations. No changes are contemplated in the personnel or operations of Nutt-Shel Company as a result of the acquisition. Lester E. Hutson will continue as president of Nutt-Shel, which will be operated as a wholly-owned subsidiary of SPS.

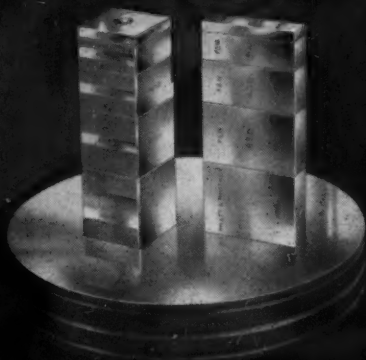
The purchase of Nutt-Shel enhances the competitive position of SPS on the West Coast where the company is currently constructing a large plant at Santa Ana, California.

★ ★ ★ ★ ★

## ± Millionths!

Precision in production demands dependably accurate basic standards of measurement. To establish and maintain these standards, there is no surer means than Pratt & Whitney Precision Gage Blocks . . . produced by the company that established the first accurate inch in American industry. P&W Gage Blocks are available: in HOKE (square type) or USA (rectangular type); Steel or Solid Carbide, Single Blocks or Complete Sets. Write for Circular 545-2. Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Connecticut.

## HOKE® USA



## PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 446 on Reader Service Card

## industry news in brief . . .

**John J. Wiest** named technical director, locknut department, **Standard Pressed Steel Company**, Jenkintown, Pennsylvania.

**John H. Charpentier** appointed sales manager, Machinery Division, **Fenn Manufacturing Company**, Newington, Connecticut.

**Smith-Courtney Company**, Seventh and Bainbridge Streets, Richmond 11, Virginia, appointed distributor in Virginia and North Carolina, **Niagara Machine and Tool Works**, Buffalo, New York.

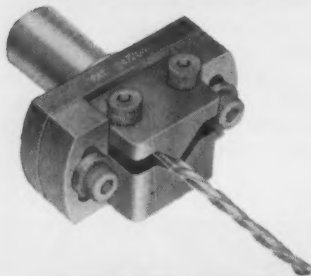
**Wilfred Quinter** appointed production foreman and **James Wallace** appointed inspection and quality control supervisor, **Northwestern Tool and Engineering Company**, Dayton, Ohio.

**George R. Lewis** appointed plant superintendent and **James Teets** named advertising manager.

**John J. Bollinger** appointed sales representative in midwestern region, Spring Division, **Crucible Steel Company of America**, Pittsburgh, Pennsylvania. **Lawrence A. Gloeckler** appointed manager-employee relations, succeeding Mr. Bollinger. **J. D. Dickerson** appointed manager, steel production and **W. B. Jones** appointed sales manager, agricultural products.

**Robert R. Rhodhamel** elected vice president and general sales manager, **The National Acme Company**, Cleveland, Ohio.

## ACCURATE SET-UPS FAST!



Accurate, rapid set-ups the first time, every time . . . is the reason Brookfield Tool Holders are now widely used in practically every metalworking plant in the country. With one Brookfield Tool Holder, you can cut your stock of bushings by at least 100. Here's why:

## BROOKFIELD TOOL HOLDERS

- **ADJUSTABLE V JAW** holds wide range of tool diameters without bushings or accessories.
- **AXIALLY TRUE DESIGN** makes perfect tool alignment almost automatic.
- **BALANCED-PRESSURE LOCKING ASSEMBLY** maintains uniform seating, eliminates creep or shift.
- **EASY TO USE** — just slip tool in the jaw, tighten, then float tool into dead center and lock.

### AVAILABLE IN A WIDE RANGE OF SIZES

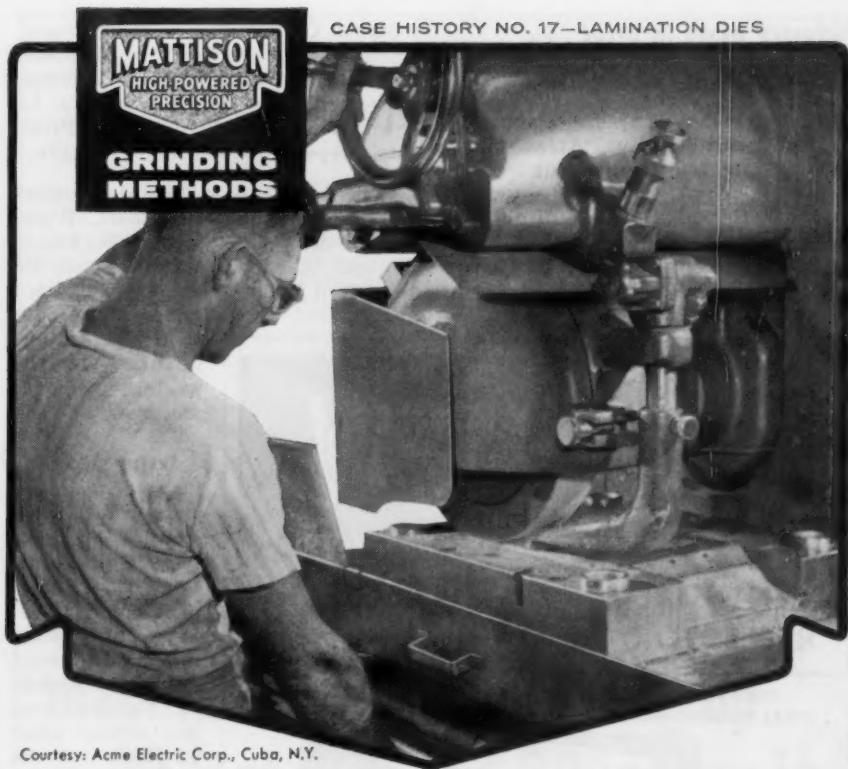
MODEL NO.	HOLDING RANGE	SHANK DIA.
BA-10	$\frac{1}{8}$ "— $\frac{3}{16}$ "	$\frac{3}{8}$ "
DA-10	$\frac{1}{8}$ "— $\frac{1}{2}$ "	$\frac{3}{4}$ "
DA-12	$\frac{1}{8}$ "— $\frac{1}{2}$ "	$\frac{3}{4}$ "
GA-12	$\frac{1}{8}$ "— $\frac{3}{4}$ "	$\frac{3}{4}$ "
GA-16	$\frac{1}{8}$ "— $\frac{3}{4}$ "	1"
KA-16	$\frac{1}{8}$ "—1"	1"
KA-24	$\frac{1}{8}$ "—1"	1 $\frac{1}{2}$ "
PA-24	$\frac{1}{4}$ "—1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "
PA-28	$\frac{1}{4}$ "—1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "

WRITE FOR ILLUSTRATED CATALOG AND PRICES!

## BROOKFIELD, INCORPORATED

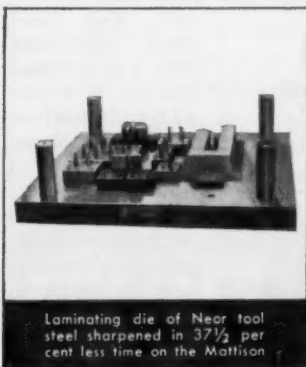
STOUGHTON 1111, MASSACHUSETTS

For more data circle 447 on Reader Service Card



Courtesy: Acme Electric Corp., Cuba, N.Y.

**Cuts die sharpening time as much as 37 1/2%  
holding parallelism within .0002 in.**



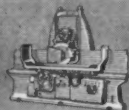
Lamination die of Near tool steel sharpened in 37 1/2 per cent less time on the Mattison

This manufacturer has reduced die sharpening time as much as 37 1/2 per cent with a new Mattison High-Powered, Precision Surface Grinder, holding parallelism within .0002 in.

The operator easily grinds the dies "dead flat" without touching the shoulders on either side. One die, which took four hours to sharpen on another machine, can now be finished in 2 1/2 hours on the Mattison.

On a Mattison Surface Grinder you can take "hogging" cuts and finish extra large surfaces fast.

**Mattison Machine Works, Rockford, Illinois, U. S. A.**



**HIGH-POWERED  
PRECISION  
SURFACE  
GRINDERS**

For more data circle 448 on Reader Service Card

**industry news in brief . . .**

**Frederick H. Edwards, Jr.**, appointed field representative, **Atrax Company**, Newington, Connecticut.

**N. J. Kassnel** appointed district manager of newly opened Cleveland sales office at 5530 State Road, Cleveland 29, Ohio, **Verson Allsteel Press Company**, Chicago, Illinois.

**Myron C. Sarnes** appointed general manager of plant No. 3 in Hillsdale, Michigan and **Edmund West** appointed general manager of plant No. 13 in Port Huron, Michigan, **Allied Products Corporation**, Detroit, Michigan.

**Robert G. Atkins** appointed manager of marketing department, **Whitney Chain Company and Hanson-Whitney Division**, Hartford, Connecticut. **Lloyd I. Fraser** appointed district manager of Detroit office and **Curtis**

**G. Green, Jr.**, appointed Southwestern regional manager.

**Irving M. Converse** named comptroller, **Thor Power Tool Company**, Chicago, Illinois. **A. V. Moroz** appointed electric tool sales manager, succeeding **Arthur H. Nelson**, who has retired after 23 years with the firm.

**Paul W. Leming** elected executive vice president, **Van Norman Industries, Inc.**, Van Norman Machine Company Division, Springfield, Massachusetts.

**John Petrovich** named sales manager and assistant to general manager, **Mohawk Tools, Inc.**, Montpelier, Ohio.

**Amazingly  
COOL  
HEAT  
VENTILATED  
REFLECTOR**

FINEST OF ALL  
LOCAL LIGHTING UNITS

**\$9.31**  
EACH  
In Std. Pkg.  
of 4



**MARVELOUS NEW  
SEEING TOOL**

Frictional arm and collar disc joints give flexibility of a thousand positions to direct light exactly as wanted. Rugged construction with heavy duty industrial socket, Levolver switch and universal base.

**INNER SHIELD  
ACCESSORY**  
for extreme  
coolness when  
using 100  
WATT lamps.

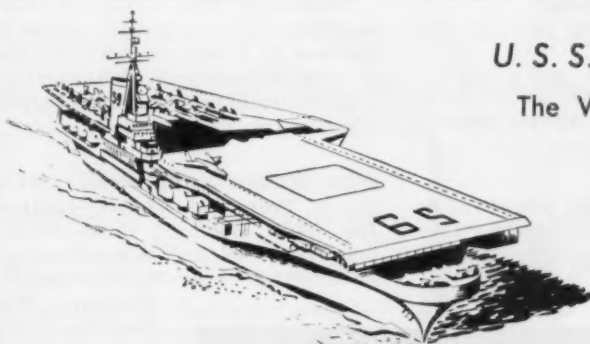
WRITE for complete  
catalog of Localite  
Models for every in-  
dustrial use.



**THE FOSTORIA PRESSED STEEL  
CORPORATION, FOSTORIA, OHIO**  
Localites are available through  
wholesalers everywhere



For more data circle 449 on Reader Service Card



U. S. S. FORRESTAL

The World's Largest  
Carrier

for which

**FULMER**

**the world's largest honing  
machine hones cylinders up  
to 30 feet long and 30 inches in  
diameter**

This particular FULMER Honing Machine stands as high as a two story building.

Regardless of size—from holes as small as 1 inch in diameter to giant 30 inch holes—Fulmer hones bores accurately, fast and with GREATER SAVINGS IN TIME, LABOR, MAINTENANCE AND ORIGINAL COST.

Tell us your honing problems . . . Fulmer engineers will be glad to offer satisfactory solutions, without obligation.

Write C. Allen Fulmer Co. • 107 East 4th Street • Dept. S • Cincinnati 2, Ohio

**FULMER**

**THE WORLD'S BEST  
honing equipment**

For more data circle 450 on Reader Service Card

November, 1957

modern machine shop 195

**AUTOMATIC COMPENSATION FOR MISALIGNMENT WITH**

## industry news in brief . . .

E. Palmer Meredith named exclusive representative, **Minster Machine Company**, Minster, Ohio.

Russell Bellinger has joined the design engineering staff of the Air Gage Division, **Dearborn Gage Company**, Dearborn, Michigan.

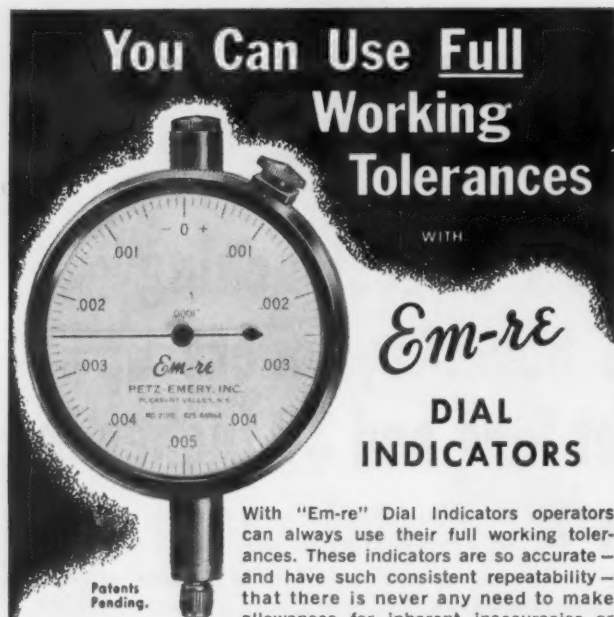
Richard R. Read appointed branch manager in the Detroit office and **Herbert A. Potter** succeeds Mr. Read as sales manager in Rochester office, **Taft-Peirce Manufacturing Company**, Woonsocket, Rhode Island.

Jay E. Watson appointed chief engineer, **Pratt and Whitney Company, Inc.**, West Hartford, Connecticut. A new branch sales office has been opened at 1220 East Fourth Street in Charlotte, North Carolina, with James F. Royster as manager and Ralph I. Friend as supervisor of office details as well as stocking progress.

W. H. Jorgensen appointed general manager, **Cleereman Machine Tool Corporation**, Green Bay, Wisconsin. **W. Gerald Tyson** appointed chief engineer for engineering design, development and research.

Wilbur L. Kennicott has been elected vice president, **Kennametal, Inc.**, Latrobe, Pennsylvania.

Robert C. Bevis promoted to assistant sales manager, domestic sales, **The Cincinnati Milling Machine Company**, Cincinnati, Ohio.



**You Can Use Full Working Tolerances**

WITH *Em-re* DIAL INDICATORS

Patents Pending.

With "Em-re" Dial Indicators operators can always use their full working tolerances. These indicators are so accurate — and have such consistent repeatability — that there is never any need to make allowances for inherent inaccuracies or sluggishness. Tolerances read on the indicator itself can be exactly the same as those specified. "Em-re" .0001" indicators, for example, are accurate to within .00002". All "Em-re" Dial Indicators are fully jeweled — with the exclusive "Em-re" 100% shockproofing system that actually contributes to the greater accuracies obtained. Stocked in 29 models, 8 ranges from .002" to 1.000"; graduations in .00005", .0001", .00025", .0005" and .001". Also available for accurate indicator testing — the "Master" Dial Indicator Checker.

Write for catalog F.

**PETZ-EMERY INC.**

PLEASANT VALLEY, NEW YORK

For more data circle 451 on Reader Service Card



## AUTOMATIC COMPENSATION FOR MISALIGNMENT WITH EMPIRE FLOATING TOOL HOLDERS AND TAP HOLDERS

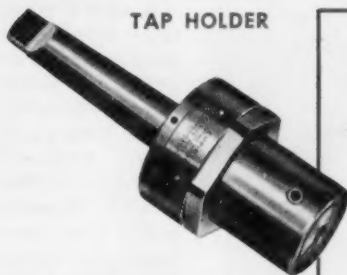
### Check These Exclusive Empire Floating Tool Holder Features:

- Automatically compensates for both angular and parallel misalignment.
- Eliminates bell mouthed and over-sized holes—permits extremely close tolerance work.
- Free and easy movement . . . tool holder sleeve and shank float independently of each other.
- Amount of float is infinitely adjustable.
- Smoother running . . . moving parts ride on rollers.
- Minimum of maintenance . . . holder has only five parts.

TOOL HOLDER



TAP HOLDER



Standard equipment with leading Machine Tool Manufacturers. Tool Holders and Tap Holders are available with either straight or tapered shanks.

### Check These Exclusive Empire Floating Tap Holder Features:

- Automatically corrects parallel and angular misalignment.
- Designed to prevent freezing under tension—taps float in and out.
- Wide range of float—simple adjustment lock-nut provides accurate control of degree of float.
- No springs or pivot members to restrict float.
- Floatation feature makes it easier to hold close tolerances.

# EMPIRE TOOL COMPANY

8776 GRINNELL AVENUE • DETROIT 13, MICHIGAN

For more data circle 452 on Reader Service Card

November, 1957

modern machine shop 197

Harlan T. Pierpont appointed manager of sales, Electro-Chemical Division, Empire Tool & Die Co.

A. Lincoln Clifford, John R. Deobald and Daniel E. Doudna have joined

**industry news in brief . . .**

James F. Wible appointed personnel director, **The Cleveland Crane and Engineering Company**, Wickliffe, Ohio.

Jerome M. Pendell appointed advertising manager, **Racine Hydraulics and Machinery, Inc.**, Racine, Wisconsin.

sin. **Simplex Engineering Company**, Zanesville, Ohio, was recently acquired by **Racine Hydraulics and Machinery, Inc.**

Changes in address of two district sales offices, **Tubular Products Division**, **The Babcock and Wilcox Company**, are as follows: in Syracuse—**Romax Building**, 731 James Street, Syracuse 3, New York; and in Boston — 66 Central Street, Wellesley 81, Massachusetts. Formerly located at 161 East 42nd Street, New York City, this district sales office of **The Babcock and Wilcox Company**, **Refractories Division**, has been moved to 135 Cedar Street, New York 6, New York.

**Robert J. Horning** appointed manager, roll grinder sales, **Farrell - Birmingham Company, Inc.**, Ansonia, Connecticut. **Harlan J. Hauser** made assistant sales manager, **Consolidated Machine Tool Division**, Rochester, New York.

**Samuel E. Tyson** appointed metallurgist, stainless steels, **The Carpenter Steel Company**, Reading, Pennsylvania.

**H I S E Y**

**SO MUCH QUALITY FOR SO LITTLE COST**

**OF CINCINNATI**



Low cost and high quality continue to typify the Hisey line as they have for fifty years. Hisey is the veteran company of grinder, buffer and polisher manufacturers . . . making both general purpose and heavy duty lines. Write today for full information.

Infinitely Variable Speed Buffer 1 to 15 HP

3 JA Drill Grinder with one drill holder

Pedestal Grinders — 10", 12", & 14" ¾ to 5 HP

Precision Grinder ¼ to 10 HP 4" to 20" Wheels

**Hisey**

**THE HISEY-WOLF MACHINE CO.**

350 MT. HOPE AVE.

Cincinnati 4, Ohio

The Hisey Line is THE COMPLETE LINE of Bench, Pedestal, Snagging, Wet and Dry, Disc and Drill Grinders . . . and famous Hisey Dust Collectors.

For more data circle 453 on Reader Service Card

**Harlan T. Pierpont** appointed manager of sales, Electro-Chemical Division; **Frederick J. Rutland** appointed manager of sales engineering for Electro-Chemical Division; **Frank B. Huke** appointed manager of Atomic Product Sales, Refractories Division; and **George H. Powers** promoted to manager of distribution for Refractories Division. **Henry G. Mogensen, Jr.**, appointed district sales engineer for Grinding Machine Division in Detroit area, **Norton Company**, Worcester, Mass. **Edwin R. Young** appointed employee counselor.

**Johnson Tool and Supply, Inc.**, 204 East Court Avenue, Des Moines, Iowa, appointed sales representative with **Dan Mollhon**, **Jim Weirich** and **Howard McNeal** in charge of sales. **John Johnson** supervises all operations, **Size Control Company**, Chicago.

**The Carborundum Company**, Bonded Abrasives Division, Niagara Falls, N. Y., announce appointment of six product managers: **D. H. Currie**; **G. S. Elsaman**; **H. M. Newberry**; **J. W. Ripple**; **W. W. Barrett** and **F. J. Miller**.

**A. Lincoln Clifford**, **John R. Deobald** and **Daniel E. Doudna** have joined **The Lincoln Electric Company's** district offices located at Columbus, Ohio; Cleveland, Ohio; and Chicago, Illinois.

**Bert Cross** named service engineer in the Atlantic district for **Carboloy** cemented carbides, **General Electric Company**, Metallurgical Products Department, Detroit, Michigan.



# SAWS

for the

# PRICE of






**... use the WELLS 49A  
for Horizontal Cut-off  
and Vertical Band Sawing**

The Wells 49A is a dual-purpose machine designed for shop or "job-site" work. As a horizontal cut-off saw, the 49A has a capacity of  $3\frac{1}{2} \times 6$ ". Swing the head to vertical position . . . it's an upright band saw. No tools required! Use it for cutting angles, slots, notches, bevels and light contour work.

The 49A can save time and money for you. Let your local Wells Distributor show you how . . . or write direct for complete information.



*The Pioneers of Horizontal*  
**METAL CUTTING  
BAND SAWS**

**WELLS MANUFACTURING CORPORATION**  
808 Tyler Street, Three Rivers, Mich.

For more data circle 454 on Reader Service Card

**Descriptions of new machines, tools  
and materials for metalworking.****JIG BORING AND  
MILLING MACHINE**

American Sip Corp., 100 East 42nd St., New York 17, N. Y., has introduced its Hydroptic-6A Jig Boring and Milling Machine, which has been specifically designed for drilling, boring and milling the increasing number and variety of parts requiring higher standards of accuracy at greater levels of production.

Featuring an enclosed optical measuring system in English units of measure, the machine is calibrated at a standard temperature of 68 degrees Fahrenheit. In this classic measuring system, the minute graduations on the Standard Scales incorporated in the work table and spindle head saddle are magnified and viewed on built in projection screens having micrometer drums with vernier readings to one ten thousandth of an inch. The numbered external reference scales, subdivided, with ten lines to the inch (0.1 inch), are read for the approximate position and final settings are made directly to the Standard Scales. The measuring system has illumination for either daylight and/or artificial light operation.

The rigid double column design has a multi-ribbed bed resting on three points, fully supporting the work table in all positions of travel. The table movement on the vee and flat bedways is infinitely variable through hydrau-

lic drive. Fine setting is by hand-wheel and there is rapid hydraulic traverse. The bedways are fully protected by steel guards. The table is locked to a separate clamping bar.

The sturdy vertical columns are bolted to the bed and provide fixed guideways for the movable cross rail. The vertical travel of the cross rail is motorized; a 1.3 h.p., 2,600 r.p.m. motor drives the lead screws through worm wheels. The two elevating lead screws are carefully selected, calibrated and mated and assure the parallelism of the movable cross rail to the table top. When the cross rail is immobile, it is automatically locked to each column by hydraulic cylinders.

The spindle head is self-contained and is securely bolted to the spindle saddle. The spindle head and the spindle quill are counterbalanced. The head is entirely new and has a low center of gravity. A two speed, 8 h.p., 1,700/3,400 r.p.m. spindle drive motor provides an increased machining power for drilling, from the solid, holes  $2\frac{3}{8}$  inches in diameter in either cast iron or steel; for milling cuts 4 by  $\frac{1}{4}$  inch in cast iron with a feed rate up to 10 inches per minute; or milling cuts of 4 by  $\frac{3}{16}$  inch with a feed rate of  $8\frac{1}{2}$  inches in diameter in steel. The peripheral speed of the gears in the gear box has been perceptibly reduced. Therefore, there is marked improvement in the quietness

Edited by L. L. BALDHOFF

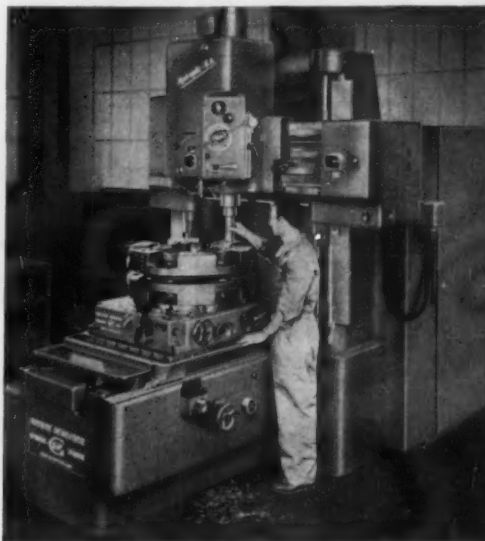
of operation, as well as improvement in the quality of the machined surfaces and the surface finishes do not exceed 4 or 5 micro inches in mean roughness.

The spindle is assembled within a nitrided quill of  $5\frac{1}{4}$  inch diameter. The quill travel is 12 inches. The quill has power feed (in both directions), automatic disengagement and sensitive handwheel feed. There is a built in quill clamping device.

The spindle itself runs on special double row, inverted taper, roller precision spindle bearings. Each individual roller and both the inner and outer races of each of the bearings are specular ground with an accuracy of cylindricity and roundness not exceeding 0.00002 inch. The surface finish of these component parts approximates less than one micro inch. The concentricity of the assembled spindle cannot exceed 0.00004 inch, as tested with a micro indicator on the spindle nose. The spindle head has a convenient preselector for the various spindle speeds. To operate, the index of the outer ring is placed opposite to the numeral corresponding to the speed chosen on the inner graduated dial. By rotating the knob, the correct diameter to be bored is brought within the window and the corresponding number of r.p.m. appears simultaneously. Once the speed has been selected, it can be engaged at any time

by a single lever. Therefore, an operator can preselect the speed for the next operation during actual machining. Eighteen spindle speeds from 40 to 2,000 r.p.m. are available and the spindle motor is equipped with an automatic electric brake. There is push-button spindle reverse rotation for tapping. The clamping and unclamping of the tools in the spindle is automatically accomplished by means of a motorized draw-in bar.

For more data circle 89 on Reader Service Card



Sip Jig Boring and Milling Machine

November, 1957

modern machine shop 201

## new shop equipment . . .

### LINE OF PRECISION SLIDE ASSEMBLIES IS EXPANDED

An expansion of its line of precision slide assemblies to 132 standard models has been announced by Russell T. Gilman, Inc., 621 Beech St., Grafton, Wis. This line and other standard, stock components are offered for building up special machines and production equipment. Overall designing and manufacturing time can be reduced, it is claimed, and mass production economies also permit money savings, as compared with the cost of entirely special components.

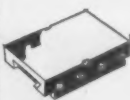
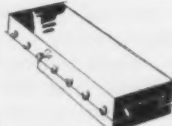

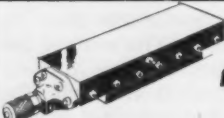
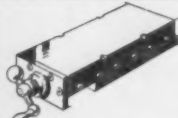

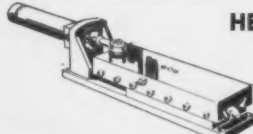
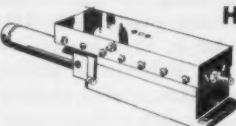
Gilman Slide Assemblies can now be supplied in a broad range of types and sizes for varied requirements. Stroke lengths ranging from  $\frac{3}{4}$  inch to 8 inches are available, with slide

working surfaces ranging from 2 by 3 to 8 by 24 inches.

Both light and heavy duty models are offered. Sliding surfaces can be furnished either milled or hand scraped. In addition to the basic slides with male and female members, gib and adjusting screws, other types include control features such as a return spring, micrometer stop, lead screw and air or hydraulic cylinder.

In Gilman Slide Assemblies, the female member slides on dovetail ways, with clearance accurately regulated by a steel gib. High tensile grey iron castings, heat treated to eliminate distortion, are machined and ground parallel top and bottom.

Offering stroke lengths from  $\frac{3}{4}$  inch to 4 inches, the light duty slides perform efficiently on many average or lighter applications within their range and capacity. Working surfaces range from 2 by 3 to 6 by 16 inches.

 <p><b>LIGHT DUTY BASIC TYPE</b></p>	 <p><b>HEAVY DUTY BASIC TYPE</b></p>
 <p><b>LIGHT DUTY TYPE WITH RETURN SPRING</b></p>	 <p><b>HEAVY DUTY MICROMETER STOP TYPE</b></p>
 <p><b>LIGHT DUTY LEAD SCREW TYPE</b></p>	 <p><b>HEAVY DUTY LEAD SCREW TYPE</b></p>
 <p><b>HEAVY DUTY CYLINDER POWERED (in-line mount)</b></p>	 <p><b>HEAVY DUTY CYLINDER POWERED (lower mount)</b></p>

Drawing shows types of Gilman Slide Assemblies, including light and heavy duty models



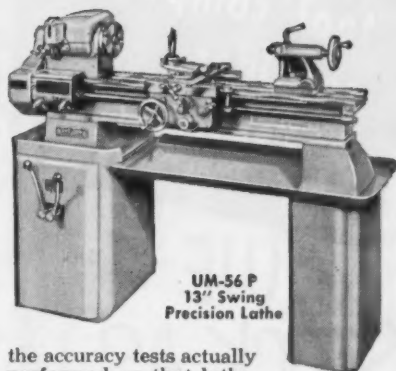
# SHELDON Precision LATHES

## for the size Lathes You Need Most

Sheldon lathes are built in the sizes you need most, for toolroom and production jobs. They are available with swings of 10", 11" and 13" . . . in varying bed lengths with 18" to 48" center distances . . . and . . . in your choice of pedestal, cabinet or bench mountings.

Powerful, all-V-belt, drive units—either the standard 8-speed (or 16-speed) E-drive; or the production favorite, a rapid, lever-shift U-drive. Where higher spindle speeds are desired, the standard E-drive can be built to provide speeds up to 2,000 r.p.m.

All Sheldon Lathes have handscraped, built-in precision. Each lathe is guaranteed to meet or surpass the American Standards for Toolroom Accuracy. With every Sheldon Lathe goes a copy of

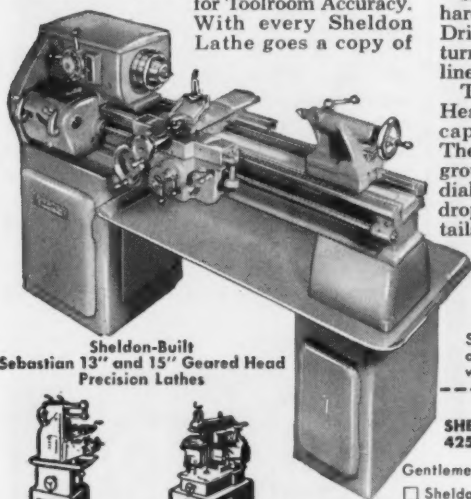


UM-56 P  
13" Swing  
Precision Lathe

the accuracy tests actually performed on that lathe. (19 checks).

Important optional features include: hardened bed ways, L00 Long Taper Key Drive spindles, 4" D1 Camlock spindles, bed turrets, taper attachments and a complete line of toolroom and production accessories.

The new Sheldon-built Sebastian Geared Head Lathes have greatly increased work capacity and many advanced features. These include a wide, heavy, hardened and ground bed . . . easy shifting spindle speed dial . . . 60-pitch gear box . . . independent drop lever apron clutches . . . cam-action tailstock clamp . . . and, automatic lubrication in the headstock and apron with "1-shot" lubrication of carriage.



Sheldon-Built  
Sebastian 13" and 15" Geared Head  
Precision Lathes



SHELDON  
Horizontal Milling Machine



SHELDON  
12" Shaper

### SHELDON MACHINE CO., Inc.

Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes.

4250 North Knox Ave., Chicago 41, Ill.

VISIT US AT BOOTH No. 1864 AT THE CHICAGO METAL SHOW • NOV. 4th-8th • CHICAGO AMPHITHEATRE

For more data circle 455 on Reader Service Card

Send in coupon or write for catalogs and names of nearest Sheldon and Sebastian Distributors where you can see these new lathes in operation.

SHELDON MACHINE CO., INC.  
4250 North Knox Avenue, Chicago 41, Illinois

Gentlemen: Please send new catalogs describing:

- ☐ Sheldon ☐ 10", ☐ 11" ☐ 13" Lathes  
☐ Sebastian 13" and 15" Geared Head Lathes  
☐ Horizontal Milling Machine ☐ Name of Local Dealer  
☐ Sheldon 12" Shaper ☐ Have representative Call.

Name ..... Title .....

Company Name .....

Street Address ..... ☐ Company

City ..... State .....

What other  
tool companies  
consider  
"SPECIALS"  
(IN DECIMAL SIZES)

...WE  
STOCK AS  
STANDARD

Thousands of chucking and  
Stub Reamers by the .001  
in Stock ready for the pre-  
cise job. Why buy or make  
"SPECIALS" when you can  
BUY from STOCK — over  
night.

**SUPERREAM**



IN EMERGENCY  
Telephone  
Libertyville 2-4200

**TWENTIETH CENTURY  
MANUFACTURING CO.**

BOX 429-M  
LIBERTYVILLE, ILL.

For more data circle 456 on Reader Service Card  
204 modern machine shop



## new shop equipment . . .

The heavy duty slides have more massive proportions throughout for increased stability where greater forces act on the slide. They provide maximum rigidity, permit long overhang and have a heavier section for mounting tools, fixtures and so on. Stroke lengths ranging from 2 to 8 inches are available, with working surfaces from 4 by 8 to 8 by 24 inches.

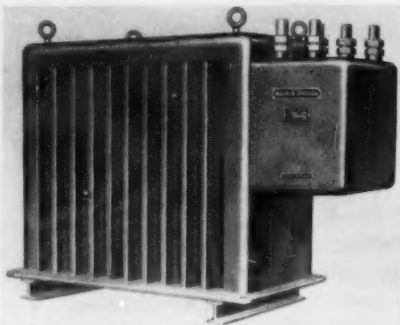
For more data circle 89 on Reader Service Card

★ ★ ★

## RECTIFIER POWER SUPPLIES

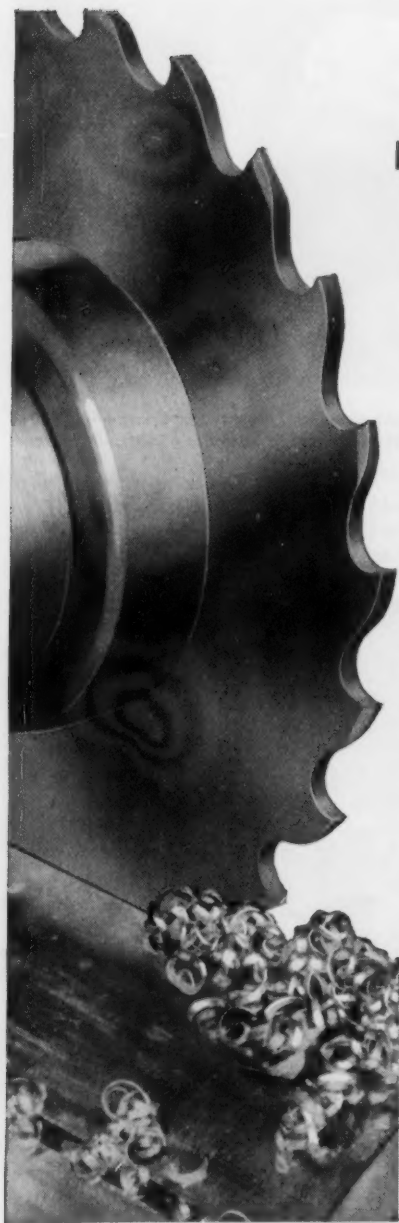
The Walker Division, Norma-Hoffman Bearings Corp., Stamford, Conn., has completed development of a line of oil filled silicon rectifier power supplies. The Walker power supply is available in the following capacities: 50, 100, 150, 200, 250, 400 and 500 k.w. with input voltages up to 4,160 volts, output up to 250 volts, d.c., and with approximately 95 per cent efficiency; voltage regulation is 5 per cent or better. Measuring 90 by 72 by 44 inches, this rectifier is cased in a sheet steel cabinet, is oil and water tight and features sealed silicon junctions.

For more data circle 90 on Reader Service Card



Walker Rectifier in a sheet steel cabinet

November, 1957



## *M&M blades assure* **less cost per cut**

**M**OTCH & MERRYWEATHER offers every user of slitting, slotting and cut-off blades three outstanding cost-saving advantages.

First, M&M's Triple Chip sawing method enables you take "bigger bites" at higher speeds. Distributing cutting strain evenly, it greatly lengthens tool life.

Second, factory repair, resharpening and resegmenting service, the fastest in the industry, minimizes costly downtime . . . reduces your investment in inventory.

Third, Motch & Merryweather manufactures a *complete line* of cutting blades to meet every circular sawing requirement. Buying all your blades from a single source—your local M&M dealer—saves valuable purchasing manhours, assures consistently high quality blades. Call him today.



**FREE**—Send today for your copy of *M&M's Circular Sawing Handbook*, a pocket-sized guide to sawing operations.



**Quality  
Service  
Availability**



Cutting Tool Manufacturing Division  
Cleveland 17, Ohio

For more data circle 457 on Reader Service Card

November, 1957

modern machine shop 205

Time savings on a single workpiece, an evaporator drum 24" in diameter and 35" long, have paid for a Motch & Merryweather blade.

## new shop equipment . . .

### MUSHROOM DISCS AND PADS IMPROVE CONTOUR POLISHING

For contour grinding or polishing in small radii or difficult contours with portable tools, a mushroom shaped molded rubber pad and coated abrasive discs have been developed by Behr-Manning Co., Dept. MM-8, Troy, N. Y. The discs and pads, currently available in diameters of 5 and 8 inches, have been designed specifically for getting into contours where disc pads of conventional type may not perform effectively. With this pad, it has become possible in many cases to do an entire contour in one operation. Also, swirl marks and gouges are virtually eliminated.

No center nut is required to fasten the disc to the pad. Instead, discs are



Behr-Manning Mushroom Shaped Molded Rubber Pad for smoothing difficult contours

held to the pad by a special adhesive, packaged in tube applicators. Abrasive discs are made in Resinall Metalite

## Commander TAPPER

- Wider Range . . . 1 Tapper Handles No. 0 to  $\frac{3}{4}$ " Taps
- Automatic Tap Protection
- Furnished to fit any Drill Press

Commander — "The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog.

### COMMANDER MFG. CO.

4224 W. Kinzie St.

Chicago 24, Ill.



Any operator  
does precision  
tapping with  
a *Commander*  
TAPPER

Product of *Commander* . . . Builder of the *Multi-Drill*

For more data circle 458 on Reader Service Card

**lodge & shipley  
model X lathe  
paid for itself  
in just 18 months!**

Time savings on a single workpiece, an evaporator drum 24" in diameter and 35" long, have paid for a Model X Lathe in just 18 months. The user, York Corporation, Division of Borg-Warner, records per piece savings at \$25.92, saving 172.8 minutes against a previous time of 465.5 minutes per piece. Annual savings figure to \$12,400!

Conservatively priced yet ruggedly durable, Lodge & Shipley Model X Lathes are an outstanding value with speed, power and accuracy equal to lathes costing far more.

If you would like a complete case history report on the Model X performance outlined above, write today: **The Lodge & Shipley Co., 3058 Colerain Ave., Cincinnati 25, Ohio.**

**Lodge & Shipley**  
*... your Lodge-ical choice*

"Cool" savings at York Corporation,  
turning evaporator drum for ice-making machine;  
time savings alone, "better than 37%!"



**PAID**

## new shop equipment . . .

cloth, an aluminum oxide abrasive with an all resin bond, in grits of 120-X, 80-X and 50-X.

Pads of 5 and 3 inch diameters are made in the proper density for polishing; a third mushroom pad in 5 inch diameter is made in a harder density for stock removal.

For more data circle 91 on Reader Service Card

## SYSTEM ELIMINATES HYDRAULIC HEAT AT ITS SOURCE

A hydraulic system, that is said to eliminate hydraulic heat at its source, has been announced by The Thompson Grinder Co., Springfield, Ohio. Hydraulic heat, localized mostly beneath the table of the machine, has always been a troublesome factor in surface grinders when long, continuous production runs are maintained.

With the evaporation of the coolant on top of the table greatly reducing temperatures on the top surfaces and with the hydraulic system heat present below the table, a condition is created where a general distortion and warpage of the whole machine occurs. Under such conditions, it becomes extremely difficult to hold the workpieces to very close tolerances.

The Thompson Hydra-Cool Hydraulic System is claimed to have shown only a 3 degree temperature rise over ambient room temperature during continuous 24 hour production runs. This 3 degree rise is compared to temperature increases ranging from 50

**MINUTES—NOT HOURS!**

**ACCURATE  
ANGULAR  
GRINDING  
SET-UPS**



**Magna-Lock**  
electro-magnetic  
**SINE CHUCKS**

Single or compound angles. Easy to use. No dials, no scales. Standard gauge blocks insure utmost accuracy. Workheld without distortion. Rugged, precision quality construction. Table of Constants furnished.



Set-up for grinding V-Block.



Set-up for grinding chamfer.



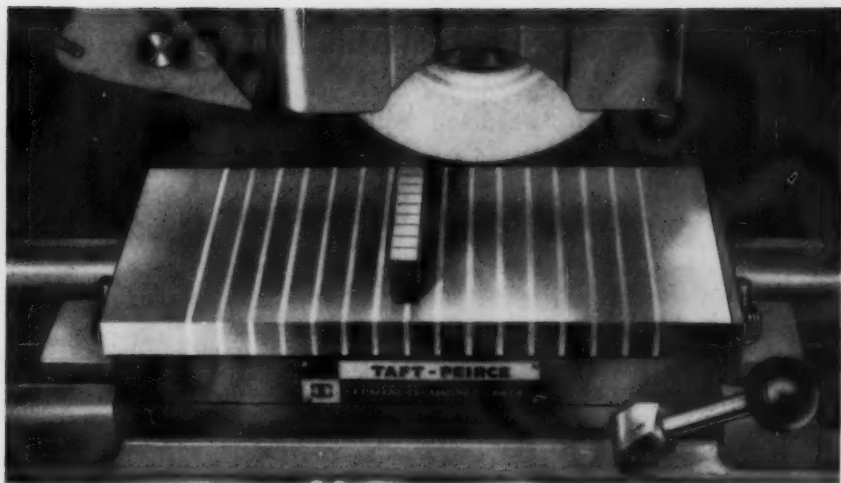
Set-up for grinding angle surface.

**Magna-Lock**  
magnetic chucks  
and devices

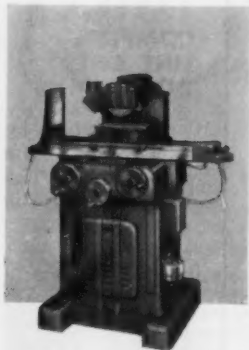
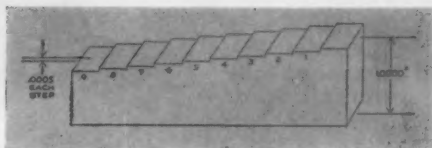
Get details, DEPT. MM-117  
**MAGNA-LOCK, INC.**  
BIG RAPIDS, MICHIGAN, U. S. A

For more data circle 460 on Reader Service Card





## New Step-Block Test Shows .000012" Downfeed Accuracy on Taft-Peirce No. 1 Grinder



This is the Taft-Peirce No. 1 Precision Surface Grinder. It offers the exclusive tilting wheel-head plus a selection of seventeen different attachments for all-purpose application. Operators easily grind to .0001", and to .00005" with experience. Surfaces are so smooth they seat without lapping.

**Gagemaker tolerances easily produced with exclusive T-P Vernier Fine-Feed — for tool room or small parts production.**

Tests of grinding accuracy on a Taft-Peirce No. 1 Grinder constantly prove the remarkable accuracy of this machine. The latest — a step-block demonstration — shows just what tolerances you can expect.

A four inch long block was ground to a height of 1.0000", then nine consecutive steps in depth increments of .0005" were ground, using the Vernier

Fine-Feed. Result: Inspection of height at each step revealed an average error of only .000012"! A T-P Versachek Electronic Gage with 4000:1 magnification was used for inspection.

This remarkable downfeed accuracy offers superlative results for tool, die, and gage work; as well as for small parts production. Plan now to add this all-purpose precision grinder to your facilities — send for Data Sheet MT-001 and Catalog.



## TAKE IT TO TAFT-PEIRCE

TAFT-PEIRCE MANUFACTURING COMPANY  
WOONSOCKET, RHODE ISLAND

T-P Means  
TOP  
Precision

For more data circle 461 on Reader Service Card

November, 1957

modern machine shop 209

## new shop equipment . . .

to 70 degrees which now prevail in other types of surface grinder hydraulic systems.

The Hydra-Cool is a pressure compensating, variable delivery system in which the delivery of oil is automatically compensated both as to volume and pressure requirements. Since this compensation is automatic, no excess

energy is present in the system to be wasted as heat. With heat eliminated directly at its source, the result is a hydraulic system that continuously operates at, or very slightly above, ambient temperatures.

In addition to assuring very close tolerances on long continuous runs, the Hydra-Cool System offers other advantages to surface grinder operation. Heat damage to seals, valves and other components of the system is said to be eliminated. Because of the automatic compensating feature, power costs on this system are reduced. Operating at very reduced temperatures, Hydra-Cool will not break down the new additive type hydraulic oils, eliminating the main cause of sludge.

For more data circle 92 on Reader Service Card

**MARKS METAL PARTS, TOOLS, DIES . . .  
PERMANENTLY, FASTER, AT LOWER COST!**

## **BURGESS** *electric* **VIBRO-GRAVER**

**WRITES LIKE A PENCIL  
ON HARDEST STEEL!**

Now you can *write* code numbers, names, and other information on steel or other hard surfaces with Burgess Vibro-Graver! Save the time, expense, and lost motion of etching with acids, writing with crayon or pasting on decals. Engraves any hard surface (including glass) as easily as writing with a pencil on paper. No special skill needed . . . anyone can use it. All marks are *permanent* because they are engraved. Used everywhere in tool rooms, inspection departments, and on production lines for permanently marking parts, jigs, dies, tools, cutters.

**VG-350 Kit with Vibro-Graver and Tantalum Carbide Point \$9.95**

**V-77 Vibro-Tool (Heavier Duty) with Tantalum Carbide Point 11.50**

**V-80 Diamond Point for Continuous Work on Hardest Steel,**

**Glass, etc. Fits Tools above . . . . . 7.50**

**For Immediate Delivery or Further Details Write**

**BURGESS VIBROGRAFTERS, INC.**

**DEPT. D-4, GRAYSLAKE, ILLINOIS**

For more data circle 462 on Reader Service Card



USED IN  
HUNDREDS  
OF  
FACTORIES  
SHOPS  
LABORATORIES

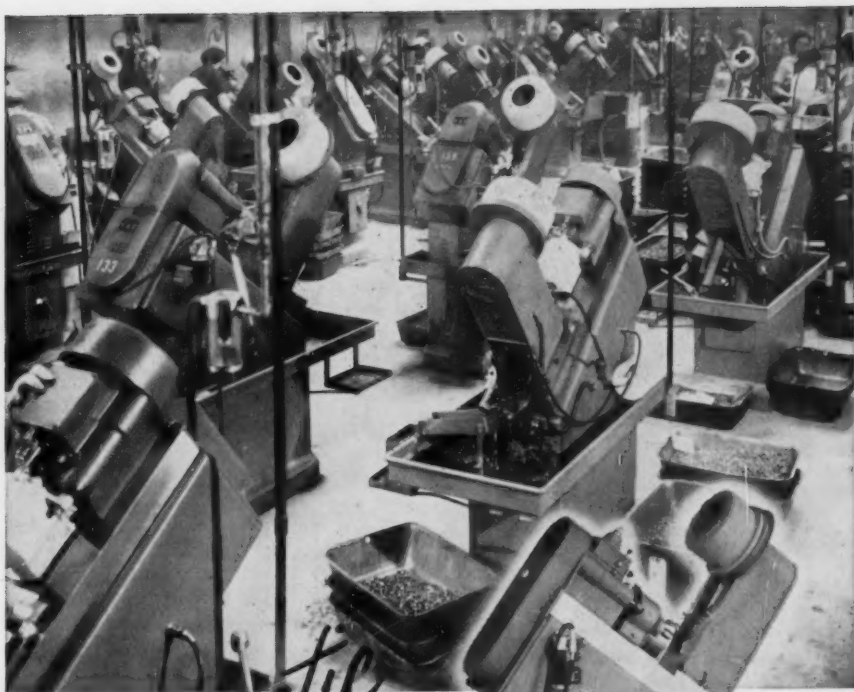
★ ★ ★

## **COMPLETE LINE OF DOWEL PINS**

Attractively packaged, a line of dowel pins has been added to the



Precision Dowel Pins



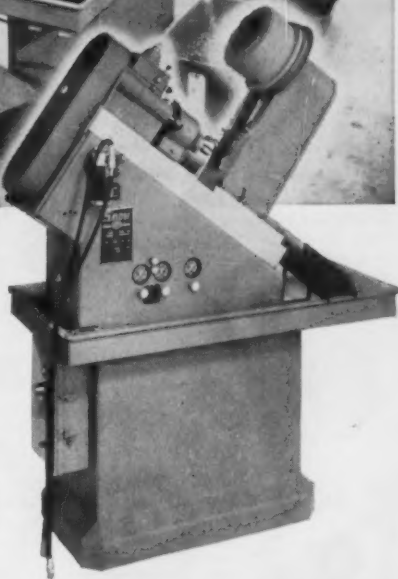
# Automatic

## NUT TAPPING MACHINES

This installation at *Shakeproof, Division of Illinois Tool Works, Elgin, Illinois*, is an illustration of productivity—with precision.

Simplicity of set-up and lower operational costs can make your Nut Tapping Department one of the most efficient and profitable in your plant. Submit samples and prints for a comparison with your present method.

VERTICAL DRILLING MACHINES  
VERTICAL TAPPING MACHINES  
VERTICAL THREADING MACHINES  
TWO SPINDLE MACHINES  
ANGULAR MACHINES  
NUT TAPPING MACHINES  
HORIZONTAL MACHINES  
DRILLING AND TAPPING UNITS  
AUTOMATIC JIGS AND FIXTURES  
DRILL PRESS TAP HEADS



# SNOW

MANUFACTURING COMPANY

435 EASTERN AVENUE, BELLWOOD, ILL.

(Suburb of Chicago)

For more data circle 463 on Reader Service Card

November, 1957

modern machine shop 211

# PALMGREN

## ROTARY AND INDEXING TABLES AND ANGLE VISES

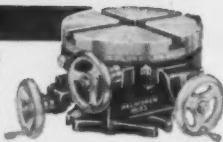
to speed up production  
on Milling Machines  
or Drill Presses

USED IN ALL INDUSTRIES

*Everywhere*

### No. 83

Rotary Table. Cross  
feed slides and rotary  
feed. Converts for vertical  
milling. 8" diameter  
\$79.95



### No. 84

Tilting Rotary Table.  
Rotary and cross feeds  
in one unit, 90° angle  
adjustment. 8" table  
top \$139.50



### No. 86

Rotary and Indexing  
Table. Graduated rotary  
feed. 8" Table  
diameter \$69.95

No. 96 (not shown),  
6" Table diameter, only \$59.95



### No. 60B

Machine Vise.

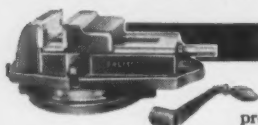
6" jaw width, a  
precision vise with  
swivel base \$99.95

Without base, No. 60 \$89.95

Also 40B. 4" jaw, with swivel base \$79.95

Without base, No. 40 \$69.95

No. 24 B Angle Vise. 4" jaw.  
Solve difficult Angle jobs on  
the production line — quick,  
accurate setups at any angle  
in such operations as drilling,  
milling, grinding. Also other  
jaw sizes: 1 1/2", 2 1/2", 3", 4",  
6" and 8". \$39.95



Ask for new catalog No. 205 for complete line,  
details and prices. 123

**CHICAGO TOOL & ENGINEERING CO.**

8399 South Chicago Ave.

Chicago 17, Illinois

For more data circle 464 on Reader Service Card

212 modern machine shop

new shop equipment . . .

family of packaged products by the  
Manufacturing Division, Precision  
Steel Warehouse, Inc., 421 Maple Ave.,  
Downers Grove, Illinois.

This unusually complete line features both standard and oversize pins of unusual accuracy, packaged for use in toolroom and machine shops. This item can also be supplied in bulk quantities. Special sizes are available.

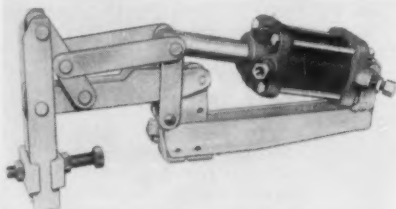
For more data circle 93 on Reader Service Card

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## 800 POUND MODEL ADDED TO AIR CLAMP SERIES

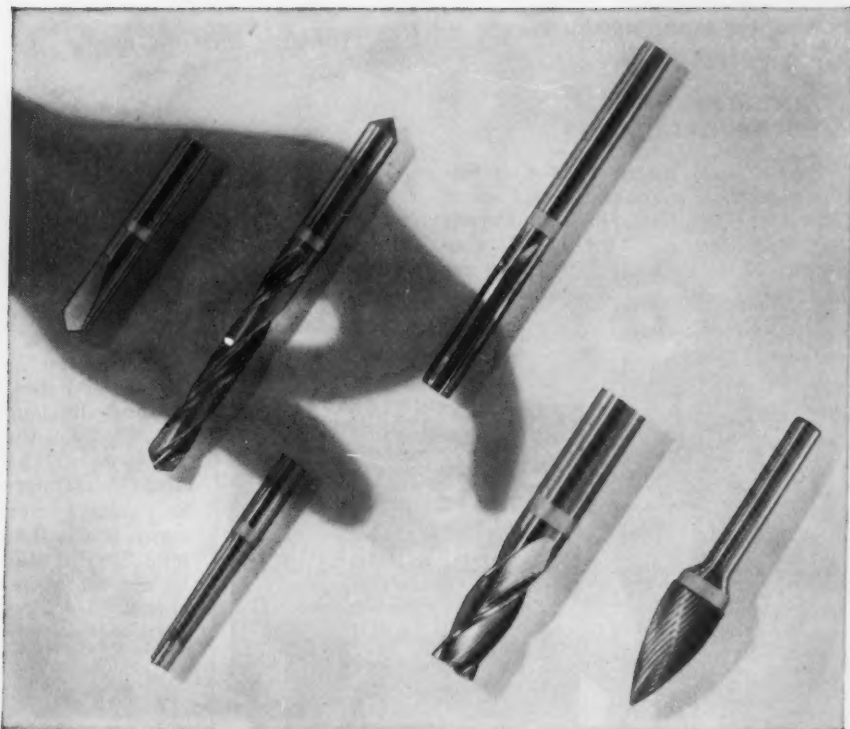
Air operated clamps, capable of exerting 800 pounds holding pressure, have been added to the air clamp line offered by Lapeer Manufacturing Co., 3048 Davison Rd., Lapeer, Mich. The company's line of Knu-Vise Clamps now includes four groups of air clamps—the 200, 400, 800 and 1,200 pound clamps. The recently developed "800" is available, as are all other clamps in the air operated series, in two standard models—the AO-800 Toggle Clamp for conventional clamping, the AODT-800 Double Toggle type for "around the corner" and other difficult mounting situations.

For more data circle 94 on Reader Service Card



Lapeer Knu-Vise 800 Pound Air Clamp

November, 1957



# IT'S EASY

*to put your finger on the right ELGIN tool*

End mills, drills, reamers, and burs—you'll find the one you want easily in the complete Elgin line. They're all grouped for quick reference in Elgin's new tool guide, "Tooling for the Future"—along with useful formulas, helpful tips, and handy charts we know you'll like. You'll like the production performance of Elgin tools, too. They're all solid carbide . . . guarantee longer runs, higher production, lower costs. Send for "Tooling for the Future" today.

**NEW TOOL GUIDE SIMPLIFIES CHOICE**



Abrasives  Division  
**ELGIN NATIONAL WATCH COMPANY**  
 Elgin, Illinois

For more data circle 465 on Reader Service Card

**new shop equipment . . .**

## **CONTINUOUS PILOT COUNTERBORE**

Fastcut Continuous Pilot Counterbores are now available from Fastcut Tool Co., 7405 East Davison, Detroit 12, Mich., in sizes for U.S.S. Cap Screws No. 6 up to  $\frac{5}{8}$  inch. They are high speed, tool steel and heat treated



**Fastcut Continuous Pilot Counterbore**

for maximum wear resistance. Concentricity between the pilot and cutter body is held extremely close by grinding the entire tool form on centers.

The design is said to lend itself to unusually long tool life. As the tool wears, the cutter body may be resharpened many times. The pilot length may be cut off as required.

For more data circle 95 on Reader Service Card



## **Taper Pins**

**made solid for**

- ✓ **STRENGTH**
- ✓ **SAFETY**
- ✓ **ACCURACY**

**Proven Durability plus  
Precision and Economy...  
Clean Bright Finish**

"Stanho" Taper Pins are made from selected steel bars, microscopically free from any defects. Milled or centerless ground precision types. Also available made from Stainless Steel, Monel, Brass, Aluminum or other metals to your specifications.

**Prompt shipments . . . in bulk or  
conveniently packaged.**

**Stocked in all sizes  
#7/0 thru #14.**

**Special diameter  
sizes made to order**

"Stanho" makes a complete line of **SOLID Taper Pins, Straight Pins, quality Cutter Pins, Woodruff Keys, Machine Keys and special parts to order.**

**Write for  
catalog  
and prices**

# **STANDARD**

Since 1872

**HORSE NAIL CORP.**

**NEW BRIGHTON, PA.**

JM-7

For more data circle 466 on Reader Service Card

## **BORING BAR HOLDER**

Universal Engineering Co., Frankenmuth 9, Mich., now has available a lathe boring bar holder. Utilizing the power feed on the lathe carriage, the holder has been designed for quick mounting on the compound tool post of the lathe.

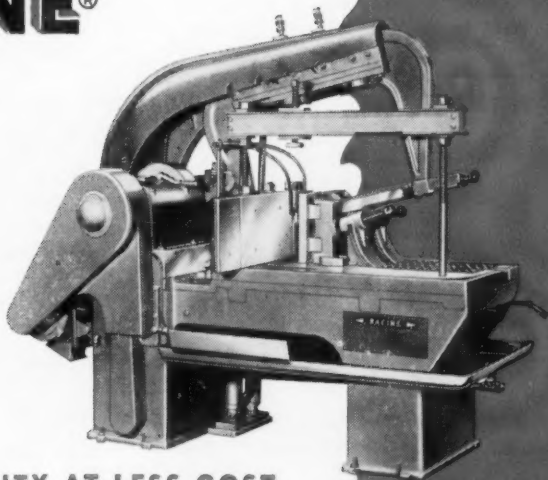
Being mounted on an eccentric, the boring bar holder can be easily adjusted



# RACINE®

**20"**  
**X**  
**20"**

**METAL  
CUTTING  
MACHINE**



## EXTRA CAPACITY AT LESS COST

The Racine 20 x 20 has a two inch greater capacity at a 31 to 37% investment saving.

Rugged, simple construction with complete, modern hydraulic controls.

A single lever controls all operations.

All parts are easily accessible.

Dual 100% progressive metered.

Positive and flexible feed.

Write for catalog and prices of complete RACINE line, including single purpose, special and fully automatic models, capacities from 6" x 6" to 20" x 20".



**RACINE HYDRAULICS & MACHINERY, INC.**

2070 Albert St., Racine, Wisconsin

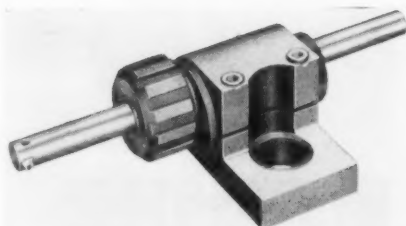
For more data circle 467 on Reader Service Card

November, 1957

modern machine shop 215

## new shop equipment . . .

by simply repositioning the eccentric to get the best cutting results from the tool. This eccentric feature also permits the holder to be used on lathes with varying center heights. The holder accommodates round boring bars from  $\frac{3}{8}$  to 1 inch diameter,



Universal Lathe Boring Bar Holder

### Buy safe "SHUR-GRIP"



#### drop forged HANDLES

Designed to hold 3 to 6 lb. lead hammer heads more firmly — will not slip — keeps hammer head in shape longer — makes remodeling easier, quicker, surer, less expensive.

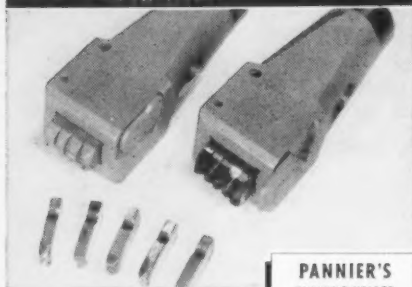
Write for circular and prices

LAWRENCE H. COOK, INC.

67 MASSAHOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle 468 on Reader Service Card

### ANOTHER PANNIER MASTER MARKER!



New Roto-Pin type lock is integral part of all Pannier Supreme Holders . . . eliminates loose, bent, dropped, or lost pins . . . flip it open to change type . . . flip it back to securely lock type in clear-marking position.

Write for complete data.

#### PANNIER'S

#### SUPREME HOLDER

#### WITH ROTO-PIN LOCK

Safe, fast type changing. Holder in variety of styles. Machined from High-Grade Bar Tool Steel. Hardened anvil maintains type alignment. Striking Head of Tool Steel . . . Replaceable to add long service life to Holder.



#### MARKING DEVICES

#### THE PANNIER CORPORATION

Offices: Los Angeles • Chicago • Cleveland • Philadelphia

202 Pannier Building • Fairfax 1-5185 • Pittsburgh 12, Pa.  
For more data circle 469 on Reader Service Card

216 modern machine shop

using the Universal collet which gives 100 per cent wrap around holding action. The bar can be adjusted for various depths. Square hole collets which accommodate square tool bits for use on counterbores and radii cuts, can also be supplied by the company.

For more data circle 96 on Reader Service Card

★ ★ ★

### AUTOMATIC LOADER AND STACKER CUTS MATERIAL HANDLING TIME

Time required to load large metal sheets or plates on to Wiedemann Turret Punch Presses has been cut from 50 to 80 per cent by an automatic loader, unloader and stacker, recently developed by the Wiedemann Machine Co., 661 Wissahickon Ave.,

#### GRIND THE

### Eastern Centerless Way

#### WE SPECIALIZE

#### 20 CENTERLESS GRINDERS

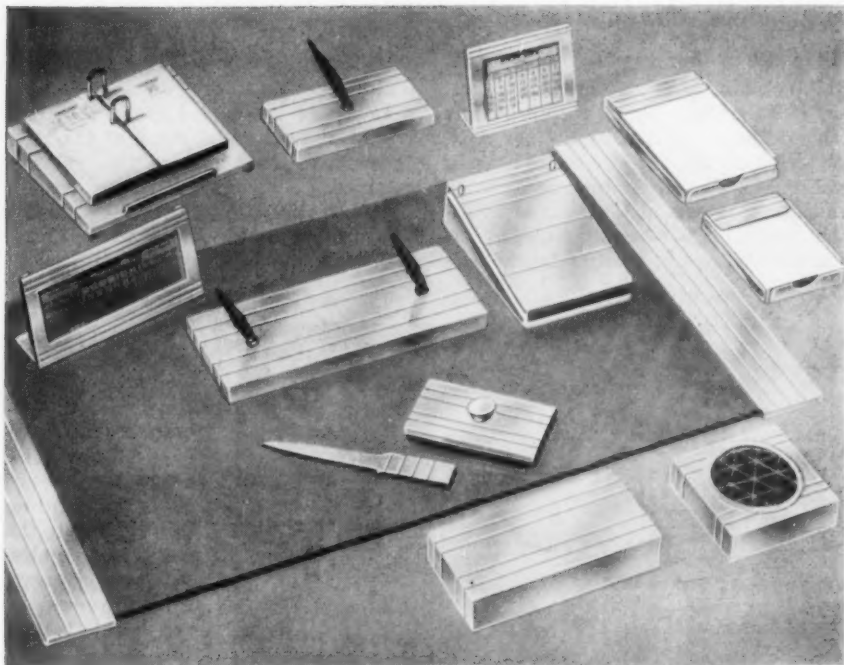
#### ESTABLISHED 1939

### Eastern Centerless Grinding Co.

470 Tolland Street East Hartford 8, Conn.

For more data circle 470 on Reader Service Card

November, 1957



A few of the fine executive desk appointments made of Formbrite by Smith Metal Arts Co., Inc.

## For a superfine luster that lasts—superfine-grain **Formbrite**

**Smith Metal Arts Co. uses easy-to-polish, scratch-resistant Formbrite to add value to its line of distinguished desk appointments.**

The fine executive desk appointments made by Smith Metal Arts Co., Inc., Buffalo, N. Y., are not just polished to shine. They are brought up to a beautiful deep luster. For their line of brass accessories they use Formbrite,® Anaconda's superfine-grain drawing brass.

They have found that the fine, uniform grain size of Formbrite enables them to give their pieces a superior, more uniform texture. The luster, furthermore, stands up better under handling because Formbrite provides a harder, more scratch-resistant surface.

In order to achieve this fine luster, Smith Metal Arts Co. must do an exceptional amount of polishing and they have chosen Formbrite because of its superior polishing characteristics. By using Formbrite they can achieve their high quality surfaces at savings of 20% over the use of ordinary brass.

**See for yourself.** Formbrite is a premium product at a nonpremium price. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you improve product quality, lower finishing costs. Write for Publication B-39. Better yet, ask for a sample or details on our trial order offer. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

**Formbrite**  
 SUPERFINE-GRAIN DRAWING BRASS  
 an **ANACONDA**® product  
 Made by The American Brass Company

For more data circle 471 on Reader Service Card

November, 1957

modern machine shop 217

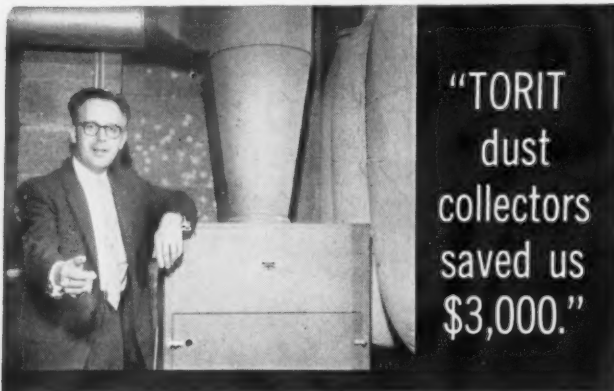
## new shop equipment . . .

Philadelphia 32, Pa. This labor saving material handling equipment has been designed primarily for use with Wiedemann Turret Punch Presses equipped with a direct measuring table and gage. It can also be made available in different sizes as required for use with shears and other fabricating

equipment. The present model loads and unloads metal up to 48 by 84 inches and up to 400 pounds in a matter of seconds.

In operation, metal to be punched is picked up from a stack at the rear of the press by a pair of 14 inch vacuum cups which are operated by an automatically controlled vacuum pump. The workpiece is automatically brought to the front of the press

and placed on the table, where the operator quickly secures it to the movable cross slide with air operated workholders. During the piercing operation, the loading unit returns to the stack, picks up the next workpiece and hovers in readiness above the table. When the first piece is fully pierced, the operator releases it by pushing a button. In rapid sequence, the workpiece is moved onto the stacker by power rollers, while the loader places the next piece on the table. Total time that the press is out of operation for loading and unloading is only 20 seconds per part. The press shown in the accompanying illustration is a 40 ton



"TORIT  
dust  
collectors  
saved us  
\$3,000."

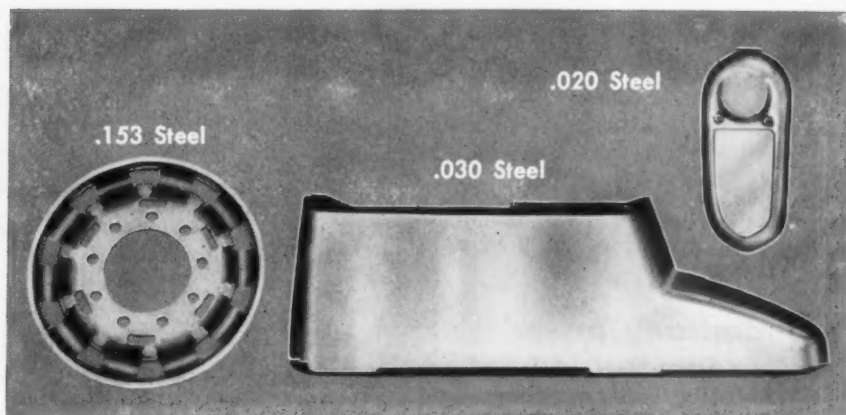
### **FREE BOOKLET shows you how to trap harmful dust better at less cost with TORIT.**

Your plant can have the same initial savings and cost-cutting operation now enjoyed by the Sico Manufacturing Company, national producers of tables and seating equipment. Sico President, Kermit H. Wilson states, "... the lowest bid we had for a central dust collection system of minimum capacity was just under \$4,000. Our \$900 Torit installation has completely solved our dust problem and gives us greater flexibility than would be possible with a central system." There's a TORIT Collector to meet every type of dust problem, why not investigate?

***FREE facts on TORIT DUST COLLECTORS that reduce maintenance costs, up production, improve employee morale. Write today to:***

**TORIT MANUFACTURING CO.**  
296 Walnut Street, St. Paul 2, Minn., Dept. 702

For more data circle 472 on Reader Service Card



## Brehm trimmed in one press stroke

Slow, costly, multiple "horn" operations and distorted edges due to "pinch" trimming can be eliminated by a Brehm Die. Operating on principles different than ordinary trimming methods, the Brehm "Shimmy" Die with angular cams causes the shearing edges to cut four ways in a single press stroke.

Materials, thickness, shapes and sizes look alike to a Brehm "Shimmy" Die. Whether it's stainless or mild steel, copper, brass, zinc, gold, fiber, silver, aluminum, rubber or plastic, Brehm users are assured of precise

production results. Shapes can vary widely, whether a watch case, artillery case, refrigerator door, automotive or aircraft part. Clean, flat, burr free edges are assured. Edge contours can be straight or curved, with multiple notches and projections.

When model changes alter the part design, or if you wish to handle an entirely new part, you only need to substitute cutting adapters.

Send part prints to your tool room in Dayton for quotation on Brehm "Shimmy" and related dies, such as blank, form, pierce.



ENGINEERING • PROCESSING • BUILDING • TOOLS  
DIES • SPECIAL MACHINES • VULCANIRE JIG  
GRINDERS • MOTORIZED ROTARY TABLES • BREHM  
"SHIMMY" AND RELATED DIES • AUTOMATION

**VULCAN TOOL CO. (YOUR TOOL ROOM IN DAYTON)**  
BREHM DIE DIVISION • 732 LORAIN AVENUE • DAYTON 10, OHIO



For more data circle 473 on Reader Service Card

November, 1957

modern machine shop 219

## **new shop equipment . . .**

capacity R-101 Wiedemann Turret Punch Press equipped with direct measuring table and gage.

Turrets on the R-101 carry 24 different punches and dies of up to 8 1/8 inches in diameter. Any punch and die is automatically rotated to piercing

## **economically priced press room equipment**

### **DURANT Scrap Choppers**

Four models to fit any power press. Employs simple electrical plug installation. Low initial cost. Enables you to get more for your scrap.

Manufacturers of Stock Reels, Roll Feeds, Straighteners, Scrap Choppers, Die Pullers, Foot Presses, Coil Cradles, Press Guards, Stock Oilers.

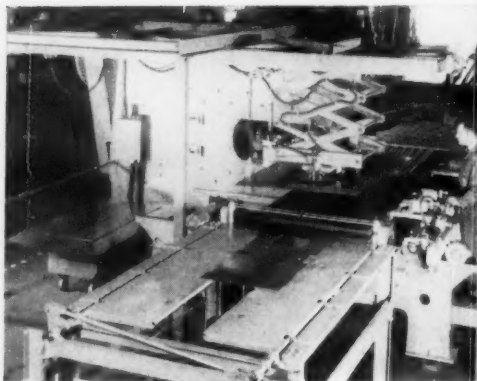


WRITE FOR NEW FREE CATALOG

## **DURANT TOOL SUPPLY Co.**

**PROVIDENCE 3, RHODE ISLAND**

For more data circle 474 on Reader Service Card



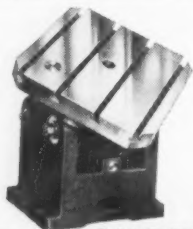
*Wiedemann Automatic Loader and Stacker*

position in 1 1/2 to 5 seconds. Work is accurately located by two large, graduated handwheels which move the work in and out and/or crosswise. The X and Y dimensions and turret station number for each hole, in turn, are read from a work chart, which advances one line with each stroke of the press.

Average locating and piercing time is 5 to 10 seconds per hole.

This work locating and piercing method with material handling equipment is said to completely eliminate the need for both layout and setup, and to provide a very low fixed handling allowance, regardless of the sheet size or thickness of same.

For more data circle 97 on Reader Service Card



## **SAVE 50% of positioning time**

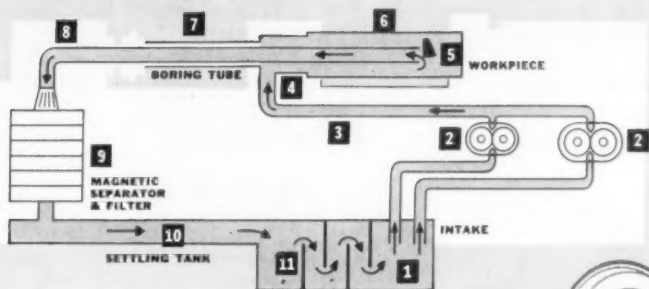
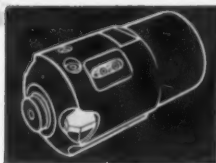
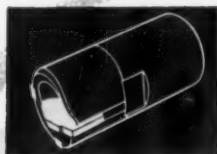
With one set-up on a Cincinnati Gilbert universal table, you can drill at any angle up to 90° on 5 sides of a cube. Provides maximum support of work piece, assures rigidity and accuracy. Table sizes: 22" and 27" square, 22" high. For complete details and specs, ask for Bulletin 850.

**THE CINCINNATI GILBERT MACHINE TOOL COMPANY • CINCINNATI 23, OHIO**

For more data circle 475 on Reader Service Card



Tools for drilling, trepanning and boring developed and patented by Heller.



In consecutive order, the numbers show the path of Shell Garia Oil 115 through a typical boring machine.



BORING AND TREPPANNING  
ASSOCIATION

## Revolutionary new rapid boring tools last 50% longer with Shell Garia Oil 115

American Heller Corporation is introducing to the U.S.A. new tools for extremely high-speed boring, trepanning and drilling of deep holes. These precision tools offer the double advantage of high-speed accuracy and excellent finish.

Used in conjunction with suitable boring machines, the tools make use of this new technique:

*Cutting oil is forced between the boring bar and wall of stock, forming a continuous bearing. The oil is forced back through the hollow boring bar, carrying away the chips as it goes.*

*Tool faces are kept clean and chip passage clear. Chips do not come in contact with finished bore. This insures greater accuracy at higher speeds and feeds than ever before possible.*

This operation required a cutting oil with extreme pressure and excellent cooling characteristics. Working with Heller, Shell engineers developed Garia® Oil 115. Experience with the new cutting oil has proved that tool life is increased 50% over conventional drilling or cutting oils.

Write for more information.

### SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK  
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

For more data circle 476 on Reader Service Card



**new shop equipment . . .**

## **LATHE EMPHASIZES TOOLROOM FEATURES AND HEAVY DUTY CONSTRUCTION**

A line of 32 speed, all geared head lathes for toolroom and production turning has been announced by the

Hendey Machine Division, Barber-32 spindle speeds from 13 to 1,500

Colman Co., 869 Rock St., Rockford, Ill. Two sizes are available: the Model 2013 with 21 inch swing over bedways and the Model 2516 with 25 inch swing over bedways. These models were formerly called 16 and 20 inch sizes. This machine combines all of the heavy duty construction features needed for production work with toolroom versatility and precision.

The all geared head makes available

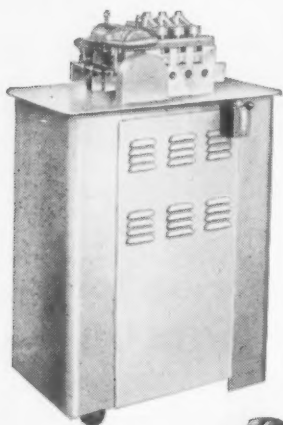
r.p.m. through crowned, flame hardened spur gears. It is also available with maximum speeds of 1,000 or 2,000 r.p.m. Use of spur gears permits a large number of speed changes by merely shifting gears, reducing the number of headstock clutches. Only two large handwheels equipped with easily read dials are used to select and shift spindle speeds, which are in geometric progression.

Three sets of precision tapered roller bearings support the spindle at both ends and in the middle. Spindle bearings are claimed to never require adjusting, regardless of the speed at which the lathe is operated. Automatic filtered lubrication is pro-

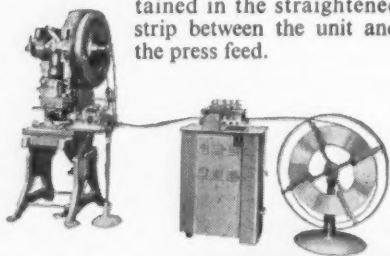
## **Economy • Dependability**

### **WITTEK STOCK STRAIGHTENERS**

Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.



This typical Wittek automatic production feeding setup includes —Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.



**Write for full particulars**

**WITTEK Manufacturing Co.**

4322 W. 24th Place • Chicago 23, Illinois

*Production  
Feeding  
Equipment*

5577

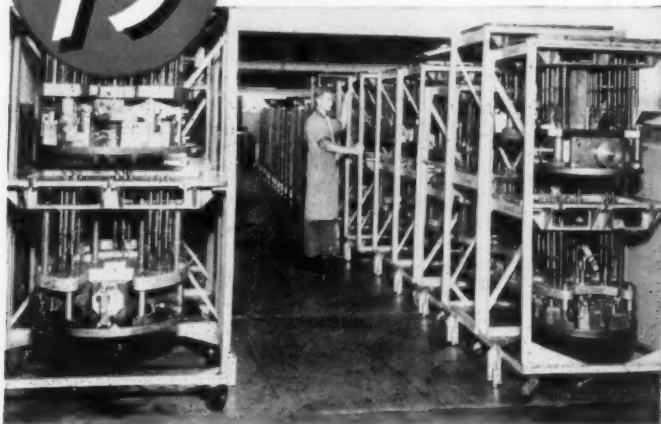


For more data circle 477 on Reader Service Card

# 75

## SEIBERT-EQUIPPED Machine Heads

at  
**WOODWARD  
GOVERNOR  
COMPANY**



### Simplify Tooling Changeovers . . . Help Build Precision Parts Faster

At Woodward Governor Co., Rockford, Ill., an ingenious method of machine head storage reduces setup time and minimizes damage to spindles and tools. The main illustration above shows how 75 interchangeable heads, equipped with more than 1500 Seibert precision-built spindles, are neatly arranged and numbered to permit fast and easy removal in and out of storage to machine location. Woodward Governor, another company whose production requires precision tolerances and high quality, has been using Seibert tools for more than 5 years.

### 3 Reasons Why Users Specify SEIBERT

Investigate the 3 reasons why users specify Seibert tools. You will find they meet exacting tolerance requirements . . . you save money for Seibert tools are lot produced in a wide range of standard sizes . . . and your orders receive prompt handling because Seibert specializes in production tools only.



#### FREE DATA

Write for Folio 1-50 illustrating and describing the complete line of Seibert Multiple Drill Spindles.



Upper and  
Lower Drive  
Assemblies



Pinion Drive  
Shafts



Universal  
Joints



Bracket Spindle  
Assembly



Adaptor

**SEIBERT & SONS, INC.** 1001 E. 24th STREET  
CHENOA, ILLINOIS

*Quality* MULTIPLE DRILL SPINDLES AND PRODUCTION TOOLS

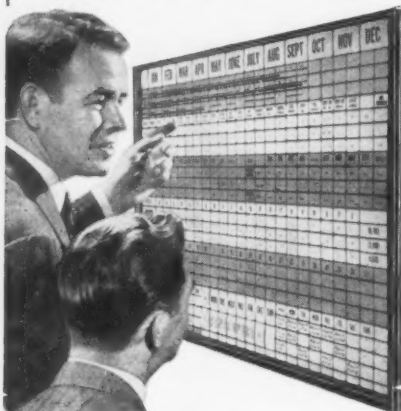


For more data circle 478 on Reader Service Card

November, 1957

modern machine shop 223

## You Get Things Done With Boardmaster Visual Control



- ☆ Gives Graphic Picture of Your Operations — Spotlighted by Color
- ☆ Facts at a glance—Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate — Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ☆ Made of Metal. Compact and Attractive. Over 200,000 in Use.

Complete price **\$49.50** including cards

**FREE**

24-PAGE BOOKLET NO. MS-10  
Without Obligation

Write for Your Copy Today

**GRAPHIC SYSTEMS**

55 West 42nd Street • New York 36, N. Y.

For more data circle 479 on Reader Service Card

224 modern machine shop

## new shop equipment . . .

vided throughout the entire headstock.

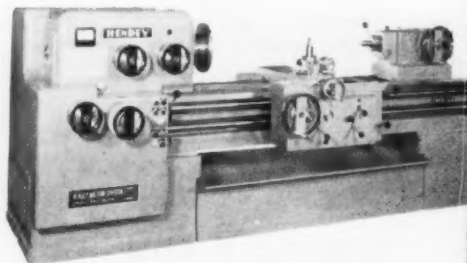
Another feature is the large, two speed tailstock that permits rigid centering of work for high speed turning. Despite its 400 pound weight, it can be positioned quickly and easily with one hand.

The tailstock bedways are hardened and ground. The large 4½ inch diameter hardened and ground, tang slotted tailstock spindle has a full 10 inch travel with a scale calibrated in 1/16 inch increments, and a slow speed for counterboring and fast speed for reaming or rapid positioning. Thus, drilling, reaming and counterboring jobs can be done with the speed and ease required in a production shop. A dial graduated in 0.001 inch increments is located at the handwheel.

The extra heavy bed casting is made of dense, wear resistant semi-steel, and all bedway surfaces are induction hardened and ground. This includes the bedways for the tailstock, as well as the carriage bedways.

Lathes can be furnished with a 15, 20 or 25 horsepower spindle drive motor and they come equipped with a load meter and, also, a spindle speed selector plate.

For more data circle 98 on Reader Service Card



Hendey Model 2013 All Geared Head Lathe

November, 1957

## Why the Contract Shop Owner Prefers **PRODUCTO** Die Sets



### **They help protect his profits**

The contract shop owner prefers Producto die sets because they help protect his die performance...his delivery promises...his profits.

The shop owner favors Producto because he can choose from a wide range of die set styles and thicknesses in steel, semi-steel or a combination.

He knows that when his dies are mounted in Producto sets, they will retain the precision built into them. He can expect maximum die life, maximum production with minimum press downtime for regrinding.

The shop owner likes the fact that Producto offers him a choice of two classes of precision, and that *he pays only for the amount of precision he buys.*

He knows that whoever handles the die will spend the least possible time taking it apart and putting it together because Producto's Qwik-Fit Guide Pins minimize die set assembly problems.

Most important, the shop owner can depend on

efficient Producto service and strategically-located Producto distribution centers to protect the delivery promises he makes to his customers.

When the contract shop owner thinks in terms of protecting his profits, he thinks of Producto die sets and accessories. You should, too.

**NEW DIE SET CATALOG No. 11** is another reason the shop owner prefers Producto. It makes selection and ordering really easy. Write for your free copy today. And ask to receive Die Set Digest, too.



**THE PRODUCTO MACHINE COMPANY**  
910 Housatonic Ave., Bridgeport 1, Connecticut



Wherever die sets are used

# **PRODUCTO**

PRODUCE MORE WITH PRODUCTO PRECISION DIE SETS

For more data circle 480 on Reader Service Card

November, 1957

modern machine shop 225

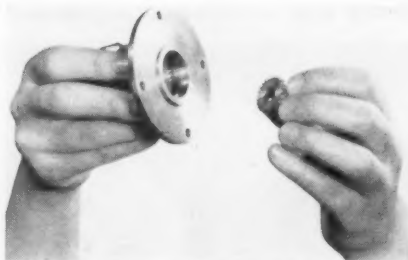
**new shop equipment . . .**

### **MINIATURE MAGNETIC BRAKE FOR DIRECT CURRENT APPLICATIONS**

Identified as the No. 2SC, a magnetically released, spring set miniature brake, announced by Stearns Electric Corp., 120 North Broadway, Milwaukee 2, Wis., has found application on computers, antenna control for radar and valves on atomic reactors.

Torque rating on this brake is 25 ounce inches, and the unit consumes 4.9 watts. Approximate physical dimensions are  $1\frac{3}{8}$  inches in diameter by 2 inches long, and the units weigh slightly over  $8\frac{1}{2}$  ounces.

The No. 2SC Miniature Brake is designed for direct current application and is wound for 28 volts. A special metallic bonded friction lining is used to provide long wear, high torque,



*Stearns No. 2SC Miniature Magnetic Brake*

high thermal capacity and additional strength to the miniature brake.

For more data circle 99 on Reader Service Card

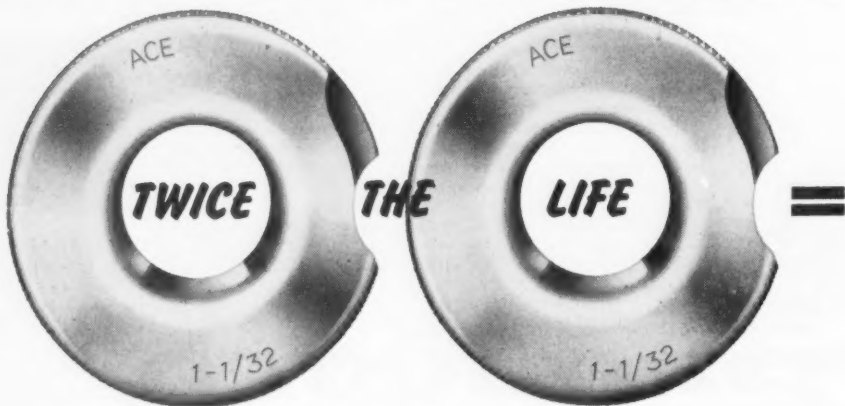
★ ★ ★

### **HORIZONTAL BORING, DRILLING AND MILLING MACHINE**

Aaron Machinery Co., Inc., Dept. M, 45 Crosby St., New York 12, N.

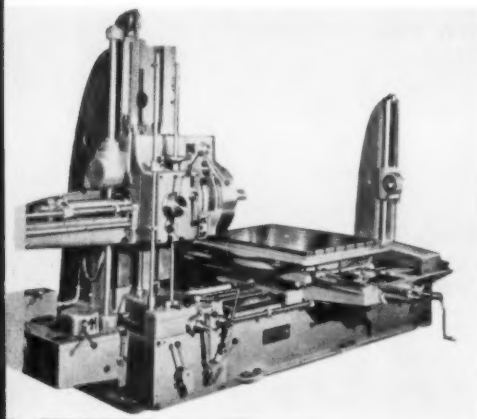
★ ★ ★ ★ ★

## **The COST of a drill bushing depends on**



For more data circle 481 on Reader Service Card



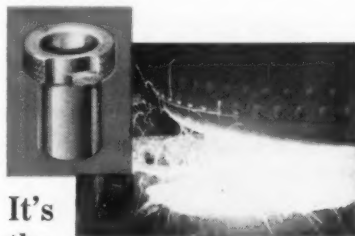


Imperial Machine bores, drills and mills

Y., has announced the availability of Imperial Horizontal Boring, Drilling and Milling Machines. These machines feature a power saving drive, which insures full utilization of carbide tip-

★ ★ ★ ★ ★

its working LIFE!



It's  
the

steel in **ACE** drill bushings...  
*that makes the difference!*

When working life is doubled... bushing costs are cut in half! Fewer bushing changeovers add *bonus production savings!* That's why ACE drill bushings of new high-carbon chromium steel are being *specified exclusively* by cost-conscious tool men everywhere! Make a *working comparison* NOW with any other make bushing... and see "Positive Proof" that *the steel makes the difference!*

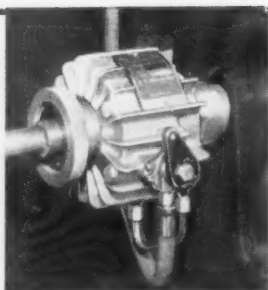
Write for the all new 1957 ACE Catalog  
and the name of your nearest distributor.

E-3.



For more data circle 482 on Reader Service Card

## WILSON AIR COLLET CLOSER



### STEP UP PRODUCTION 20% +

... for most lathes to 1"  
bar stock capacity

- Hold delicate parts without damage or adjustment
- Iron grip for heavy work
- No adjusting for stock or part variations
- Finger-tip or foot control eliminates operator fatigue
- Eliminates jarring of head stock

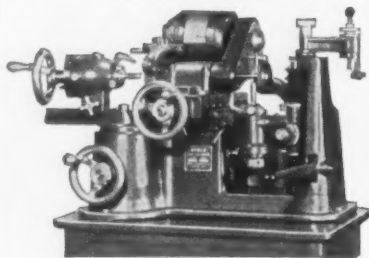
(Ten day FREE TRIAL to reliable firms)

**WILSON AIR COLLET CLOSER, INC.**  
909 40th Ave. NE, Minneapolis 21, Minn.

For more data circle 483 on Reader Service Card

## HYBCO TAP GRINDER

Sharpens Chamfers, Flutes  
and Spiral Points



MODEL 1100

- Capacities No. 0 Machine Screw to  
1 1/2" Hand Taps.

**HENRY P. BOGGIS & CO.**  
708 E. 163rd St., Cleveland 10, Ohio

For more data circle 484 on Reader Service Card

228 modern machine shop

## new shop equipment . . .

### COMPLETE LINE OF ALL STEEL HYDRAULIC PRESS BRAKES

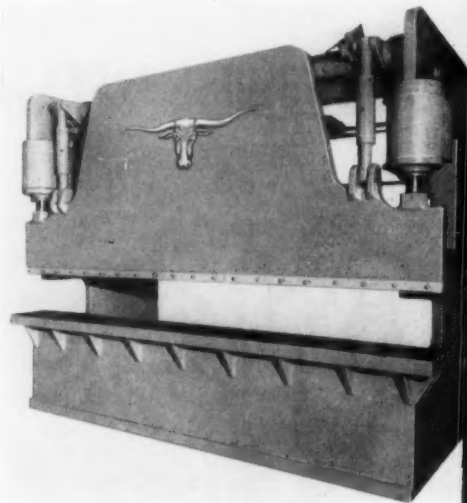
The Perry Co., P. O. Box 2057, Waco, Texas, has announced a completely new line of all steel hydraulic press brakes to be marketed under the tradename of Longhorn.

Standard press brakes are currently being produced from 160 to 1,500 ton capacities. Special Longhorn Press Brakes, designed to customer specifications and capacities, are also available.

Longhorn Press Brakes have been designed to handle all metal forming operations and for trimming and punching vacuum formed plastics, as well as other materials.

All of these units are equipped with NEMA 12 or J.I.C. standard electrical circuits.

For more data circle 101 on Reader Service Card



Longhorn All Steel Hydraulic Press Brake

November, 1957

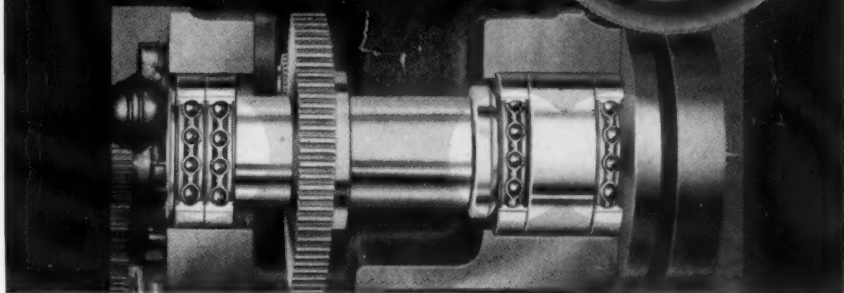
Advanced Design at Work

why the spindle on *Logan* Lathes

takes high and low speeds

*With No Bearing Adjustment*

...more Sustained Accuracy



■HEAVY or light loads, high or low speeds, the ball bearing spindle on a Logan Lathe is always ready to roll. You don't have to set it tight for one job, loose for another.

Why? Because the ball bearings in a Logan spindle are not only pre-loaded and grease-sealed — they're *pre-set* for precision accuracy over a wide speed range. Thus, original spindle accuracy is sustained *far* longer than usual with plain or tapered roller bearing mountings.

Interested in high speed production and second operations? Logan's many quality features can be seen first-hand at your nearby Logan dealer. Drop in today! Catalog on request.

*Look at a Logan before you leap*

---

**LOGAN ENGINEERING CO.**

4901 LAWRENCE AVENUE, CHICAGO 30, ILLINOIS

For more data circle 405 on Reader Service Card

November, 1957

modern machine shop 229

new shop equipment . . .

### UNIT POWERS THE FEED ON MULTIPLE DRILLING APPLICATIONS

A heavy duty power feed unit, designated as the Model HDPF-170 Hy-Torque, has recently been added to the line of Controlled-Air-Power self-contained work devices, marketed by The

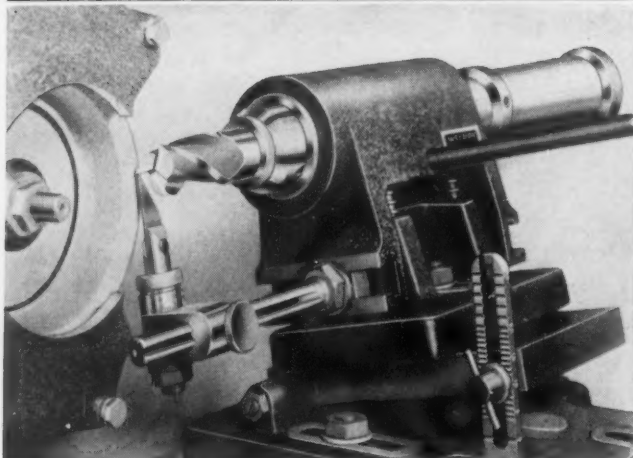
Bellows Co., Dept. MMS-757, Akron 9, Ohio.

The Bellows Hy-Torque is a rugged, complete heavy duty unit designed primarily to power the feed on multiple drilling applications. The basic unit consists of a steel gear rack which drives a pinion gear mounted on a shaft with a hub as the drive unit. The 3,000 inch-pounds maximum torque delivered at the hub may be applied to any cross feed shaft or driven

shaft for either rotational or linear movement. Four standard models provide a choice of degree of rotation of the 4 inch pitch diameter pinion gear: 170, 255, 340 or 425 degrees.

A 4½ inch bore air motor advances the gear rack with a thrust of 15 times applied air line pressure. Two Hydro-Checks govern the feed rate and serve to balance the hydraulic reaction during the feed portion of the stroke. The unit's hydraulic feed rate is fully adjusted by one control valve which controls the Hydro - Checks. The Hydro-Checks may be set, by means of adjusting lock-nuts, to control the feed through the entire stroke, or they may be

YESTERDAY'S PIONEER . . . TODAY'S LEADER



## WELDON END MILL SHARPENING FIXTURE

● The Weldon Sharpening Fixture quickly resharps end mills from ¼" to 2" inclusive. Unnecessary to line up the fixture as it will always grind straight. Designed for any grinder with flat table. No table movement necessary.

Requires little skill to operate. Increases life of end mills and improves their performance.

*Write for Circular.*

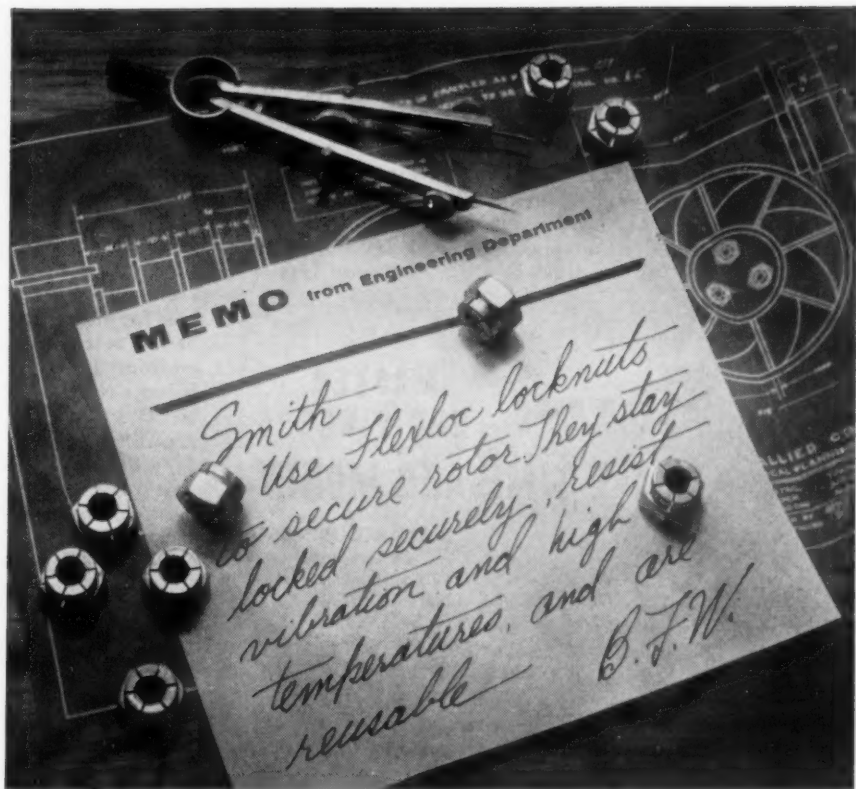
Weldon distributors throughout U. S. A. and Canada  
carry complete stocks to serve you.

## THE WELDON TOOL COMPANY



3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 486 on Reader Service Card



## Vibration won't loosen FLEXLOC self-locking nuts

Where products must be reliable . . . must stand up under vibration, temperature extremes and hard use . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts.

**Here's why.** FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting locking action. And they are reusable: repeated removal and replacement,

frequent adjustments, even rough screw threads will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes, types and materials to meet the most critical locknut requirements. Your local industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

**FLEXLOC** LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

**SPS**

JENKINTOWN PENNSYLVANIA

For more data circle 487 on Reader Service Card

November, 1957

modern machine shop 231

## **new shop equipment . . .**

set to "rapid traverse" then "check" or slow rate of speed at any predetermined point, such as the "break through" point in drilling. "Skip" and "stop" checking action is optional in either electrical or pneumatic controls. The speed of either the advance or return stroke is fully adjustable by

means of two throttle screws on the Electroaire Valve, an integral part of the air motor. For rapid and frequent cycling, the retract speed may be used in the "wide open" position. In this case, the rear cushion adjustment on the air motor will reduce the retract speed to zero quickly and quietly without jar or shock.

Hy-Torque will operate on any air pressure between 15 and 150 pounds.

Units are available for either line or low voltage operation. For low voltage control (8 to 12 volts), a transformer is supplied with the unit to reduce primary voltage from 115, 220 or 440 volts to the proper voltage input of the Bellows Low Voltage Electroaire Valve. A retract switch (may also be used for dwell control) and an auxiliary switch for synchronizing the Hy-Torque Unit with other equipment, are built into the unit. The auxiliary switch will act as a continuous cycling switch, if it is so wired.

The rack and gear assembly is housed in a sturdy, serviceable cabinet. The air motor and Hydro-Check assembly, not being cabinet-



## **MASTER GREEN FEED FINGERS SAVE TIME AND MONEY**

### **QUICK ADJUSTMENT**

. . . done without removing from the machine.

**NO SCORING . . .**  
synthetic rubber inserts give rubber-to-metal contact.

**UNIFORM TENSION . . .**  
gives all-over wiped grip with no crimping of thin-wall tubing.

**SIMPLE CONSTRUCTION . . .**  
only four parts avoids maintenance and insures a long service life.

## **GREEN FULL FLOATING REAMER HOLDER**

**FLOATING ALIGNMENT . . .**  
saves reamer cutting edges by compensating for any misalignment of reamer and drilled hole. Available with either standard or tapered shank.



Write for catalog sheets and prices.



# **GREEN**

## **MANUFACTURING COMPANY**

122 S. Prairie Ave.

Rockton, Illinois

For more data circle 488 on Reader Service Card



How Bullard  
with two

Man-au-trol turret heads are gang-planed

**OK**

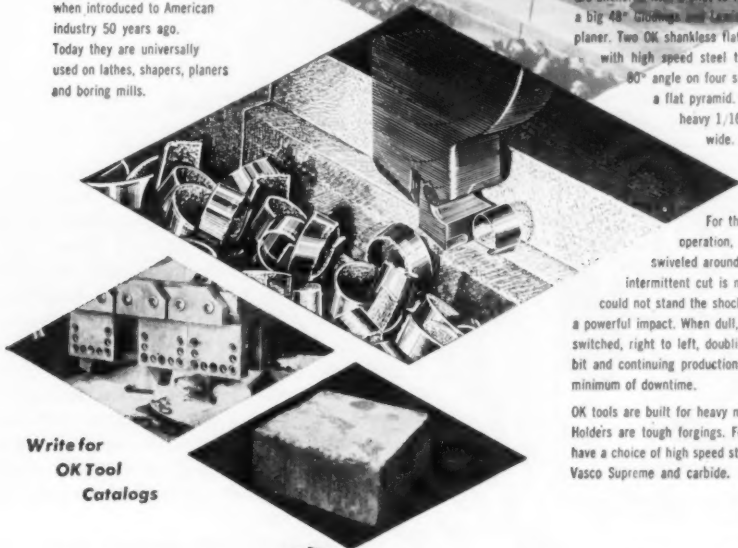
**single point tools**

The makers of OK single point tools originated the world's first system of inserted tool bits, preground, ready to use.



OK single point tools with their interchangeable tool bits were revolutionary when introduced to American industry 50 years ago. Today they are universally used on lathes, shapers, planers and boring mills.

Nine forged billets of SAE 1045 carbon steel, size 20 x 20 x 12" and weighing 1000 lb. are anchored with a pilot to the bed of a big 48" lathe and a 100 hp Hypro planer. Two OK shankless flat-nose tools with high speed steel tool bits cut an 80° angle on four sides, making a flat pyramid. Chips are heavy 1/16" depth, 3/4" wide. Feed, 40 ft./m.



For the second operation, the blocks are swiveled around and a rugged intermittent cut is made. Carbide could not stand the shock of such a powerful impact. When dull, tool bits are switched, right to left, doubling to life of the bit and continuing production with the minimum of downtime.

OK tools are built for heavy machining. Holders are tough forgings. For tool bits, you have a choice of high speed steel, cobalt, Vasco Supreme and carbide.

Write for  
**OK Tool  
Catalogs**

TWO COMPONENTS—  
BODY AND  
BLADES



**OK**

**modern milling cutters  
for modern milling machines**

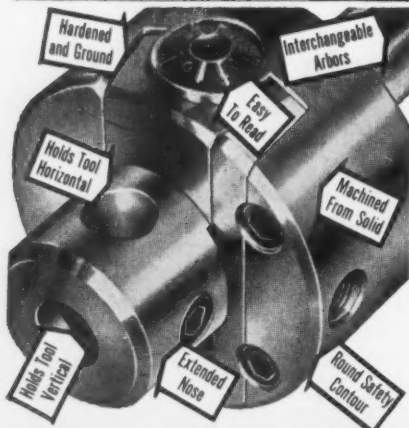
THE OK TOOL CO., INC., Milford, New Hampshire

For more data circle 489 on Reader Service Card

November, 1957

modern machine shop 233

## FLYNN BORING HEADS



**LEADING NAME IN  
BORING HEADS FOR 40 YEARS  
19 MODELS** Write for catalog

**FLYNN MANUFACTURING CO.**  
133 FLOWERDALE AVE. • DETROIT 20, MICH.

For more data circle 490 on Reader Service Card

**Here's  
the  
dope!**

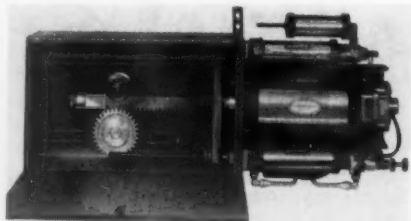
**TAMMS**  
DIRECTIONS: Wipe off oil or grease. Apply with cloth or brush.  
**BLUE  
LAYOUT  
DOPE**  
TAMMS INDUSTRIES, INC.  
236 N. LaSalle St., Chicago 1, Ill.

**WRITE  
for  
SAMPLE**

**DRYS FAST-RESISTS OIL  
WON'T CHIP, CRACK OR FLAKE OFF!**

For more data circle 491 on Reader Service Card

## new shop equipment . . .



**Bellows Hy-Torque Heavy Duty Power Feed**

ed, are readily accessible for control adjustments. The power feed unit is quickly and easily mounted, in any position, at two mounting points. One mount is the pinion shaft connection itself, and the other is a floating hanger which is located at the rear of the frame which provides self-alignment.

For more data circle 102 on Reader Service Card

★ ★ ★

## FULLY ADJUSTABLE MULTIPLE HEAD

The first two models of a completely new type Universal Ball Joint Adjustable Spindle Multiple Head have been added to the line of Ettco-Emrick small hole drilling and tapping equipment by Ettco Tool and Machine Co., Inc., 598 Johnson Ave., Brooklyn 37, N. Y. As shown in the accompanying illustration, both models feature a circle type spindle arrangement, one with six spindles (Model 600) and the other with eight (Model 800). Either one will accurately drill or tap an almost unlimited variety of hole patterns.

These heads are shipped ready to attach to any standard drill press through an Ettco-Emrick drilling or tapping faceplate, or they will fit any standard Ettco drilling or tapping unit



**BARNESDRIL**

**coolant separator  
increases  
production 15%**

**pays for itself  
in less than 9 months**

Automatically separating ferrous particles from coolant with a #2 Barnesdril Magnetic Separator and recirculating it, has produced a saving of \$20.00 per week\* on this cylindrical semi-automatic grinder.

Benefits such as improved finish, less downtime and less coolant waste were immediately noticeable. Additional benefits, such as the reduction of dermatitis and increased operator comfort, were noted only after the coolant separator was in operation some time.

These benefits are typical of the savings and benefits accrued when a Barnesdril separator is installed. Call your Barnesdril Factory Representative today or write for Catalog 300E.

**\* SAVINGS PER WEEK:**

3¼ hrs Cleaning Time  
3¼ hrs Operator's Time  
1.87 gals. Coolant  
25% Wheel Life

**BARNESDRIL**  
#2 Magnetic  
Separator installed  
on a cylindrical  
grinder.

**FILTRATION DIVISION**



th year

**BARNES DRILL CO.**

840 CHESTNUT STREET • ROCKFORD, ILLINOIS  
DETROIT OFFICE: 3419 South Telegraph Road

For more data circle 492 on Reader Service Card

## new shop equipment . . .

or machine. These heads are claimed to run at top speed in any operating position in either direction without vibration, regardless of the location of the spindle.

The spindles are constructed from long wearing chrome nickel steel and



**TRUE POINT  
DRILL SHARPENER**

for Drills 41-60 and  
61-80 R.H. & L.H.

A properly sharpened drill cuts  
faster — more accurately and is  
less likely to break.

Write for circular and  
full details.

**UP-TO-DATE TOOL CO.**

P. O. Box 99, Station A, Worcester 8, Mass.

For more data circle 493 on Reader Service Card

## Precision Tapping

*by hand or machine with*

### DAHLSTROM TAP GUIDE

A low-cost Dahlstrom Tap Guide provides the accuracy and close tolerances of large, expensive machines. Tap breakage, is virtually eliminated because material is always held straight and square. Light enough for portability, yet it can be bolted permanently to wall or post.

saves countless hours  
by preventing  
broken taps.



#### Machine Tapping

The spindle top is center-bored to fit the tail stock of a lathe. Simply pull out for lathe use. Same spindle can be used as a tap extension for reaching difficult places. Furnished with 9 adaptor sizes: 8-32; 10-24; 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", and 3/4". Write for bulletin.

For more data circle 494 on Reader Service Card

**\$59.50 F. O. B.  
FACTORY**

**BRANCH MFG. CO.**  
15 Olson Drive,  
North Branch Minn.



Ellico-Emrick Model 600 Six Spindle Circle Type Universal Ball Joint Adjustable Spindle Multiple Head is shown here set up for drilling on a standard drill press

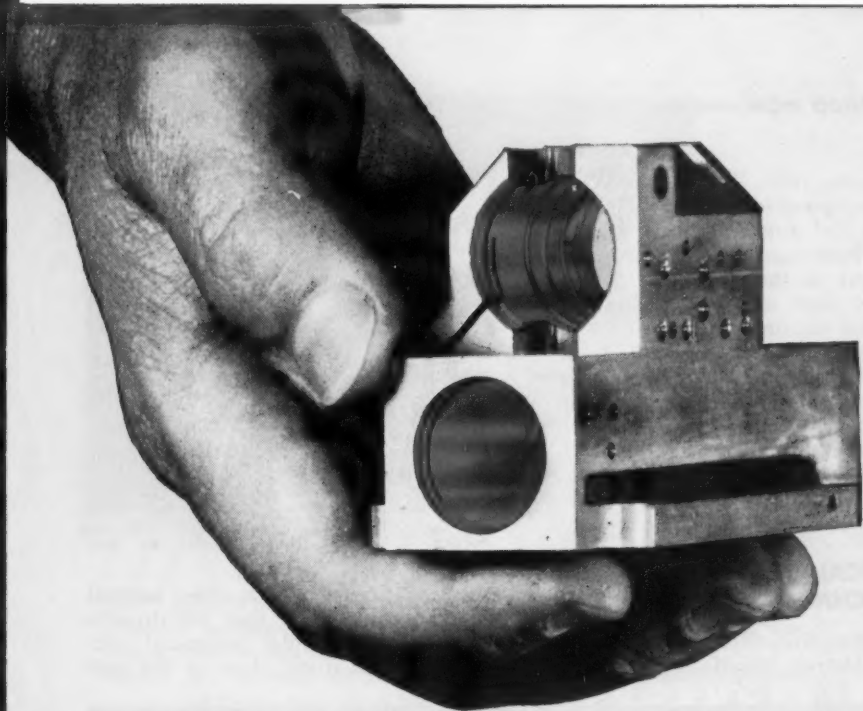
can be quickly added to or removed from the gear case, making it easy to change the number in use as needed. They can be quickly located anywhere within a 3 inch diameter with a 15/16 inch minimum center distance, even while the unit is running. All universal ball joints are lubricated with one shot lubrication, and both joints and alemite grease nipples are covered with Neoprene covers to keep the lubricant in.

The gear case itself is constructed from an aluminum alloy for light weight and provides 1:1 drive to driv-

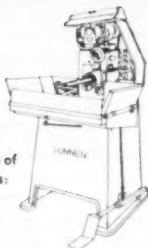
### CENTERLESS GRINDING

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 495 on Reader Service Card



## NO ROOM FOR ERROR IN THIS \$300 PART!



Diameter range of  
standard honing tools:  
 $\frac{1}{8}$ " to  $2\frac{1}{8}$ ".

send for five  
informative  
honin g booklets



CHECK READER SERVICE CARD

**SUNNEN**  
PRODUCTS COMPANY  
**HONING**

7924-K Manchester Ave.  
St. Louis 17, Mo.  
Canadian Factory: Chatham, Ont.

This aluminum servo-valve body represents an investment of nearly \$300 before the two large holes are sized and finished. With so much at stake, you can't afford any hole machining error that would put the part on the scrap pile!

The method which proved reliable enough to assure the required precision was Sunnen Honing. It guaranteed the specified tolerances of .0005" and .0002" . . . with 16 and 8 micro-inch finish for the respective holes. Sunnen Honing also guarantees geometric roundness and straightness . . . with controlled stock removal from thousandths to split-tenths as desired.

Your hole job may not be this critical, but Sunnen Honing can help you, too—on production runs, job lots and salvage. Your capital investment and cost per piece are surprisingly low. Average honing machine installation with tooling runs about \$1,000. Why not write us about your problem?

## new shop equipment . . .

en spindle ratio. The spindles have a grooved precision type ball bearing thrust and run in grease lubricated oilite bushings. Guide bushings are provided in the gear case for extra rigidity and alignment when guide rods are required.

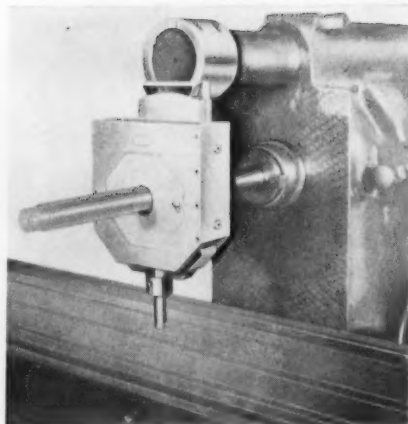
Where the advantages of fixed spindle operation are desired by the user, aluminum templates, jig bored to requirement, can be supplied instead of spindle locating arms.

For more data circle 103 on Reader Service Card

★ ★ ★

### VERTICAL SHAPING ATTACHMENT FOR MILLS

Dorden and Co., 18750 Fitzpatrick Ave., Detroit 28, Mich., is now mar-



Dorden Mill-Shape Unit mounted on mill

keting a precision high speed vertical shaping attachment that fits directly on any 1 inch regular horizontal milling machine arbor, close to the mill

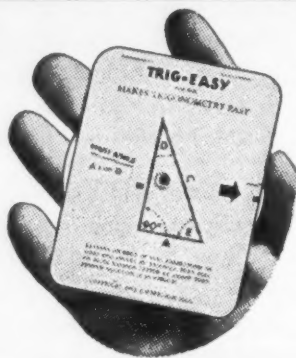
## EASY MATH. AT YOUR FINGERTIPS

**USING THESE EQUATION CHARTS YOU CAN CALCULATE IN HIGHER MATHEMATICS. NO PREVIOUS TRAINING NECESSARY.**

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New Manual for  
**MECHANICS'  
CALCULATION**



**EARL H. NEEDHAM**  
CULVER CITY, CALIF., U. S. A.  
P. O. BOX 587, DEPT. R

SOLD BY EUGENE DIETZGEN CO.

TRIG-EASY chart for plane angles and dimensions (As Shown) **Postpaid 50 cents**

TRIG-EASY chart for spherical angles and dimensions **Postpaid 75 cents**

TRIG-EASY chart with pocket manual over 140 pages, 60 drawings, & decimal trig-function table for compound angles and dimensions in machine set up, etc.

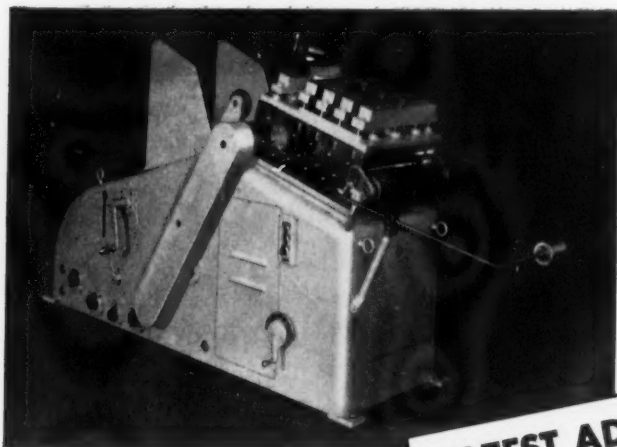
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TRIG-EASY complete set, 3 charts and instructions listed above **Postpaid \$3.00**

CURVEASY set 2 charts with pocket manual of over 60 pages, 50 drawings for section areas and volumes of a circle, sphere, ellipse and parabola; cylinders, cone and frustum **Postpaid \$2.50**

For more data circle 497 on Reader Service Card





**LATEST ADDITION  
TO THE LINE OF**



**FOR EFFICIENT  
COIL HANDLING**

Units in the line of U. S. Automatic Press Room Equipment are designed to help you reduce stamping costs through the efficient use of stock in coils. The Model PDSC-1648 Combination Coil Cradle—Power-Driven Straightener illustrated above, has a capacity for material up to 16 inches in width,  $\frac{1}{8}$ -inch in thickness, in coils up to 48" O.D. It is the latest addition to the U. S. line designed to help you gain all the cost-cutting potential inherent in the use of coil stock. Where floor space is a factor, a Combination Unit like this can often be used in an area too small to accommodate a separate Straightener and Cradle.

Satisfactory feeding into the press is often dependent upon: (1) the straightness of the stock and (2) the manner in which the coil is supported and unwound. U. S. Stock Straighteners, Stock Reels, Coil Cradles and Combination Units are built in a range of sizes and types to suit your particular requirements.

*Ask for Bulletins 80-S and 95-S for detailed information on units in the line of U. S. Automatic Press Room Equipment.*

**U. S. PRODUCTS**

Slide Feeds  
Roll Feeds  
Stock Straighteners  
Stock Reels  
Stock Oilers  
Coil Cradles  
Wire Straighteners  
Die Sets  
Multi-Slides®  
Multi-Millers®

**U. S. TOOL COMPANY, Inc.**

**AMPERE (East Orange)**

**NEW JERSEY**

For more data circle 498 on Reader Service Card

November, 1957

modern machine shop 239

## new shop equipment . . .

frame or as far out as the arbor will permit, just like changing a regular milling cutter in minutes. Two features of this attachment are an adjustable cutting stroke to 3 inches and swivel in two directions for taper shaping. It is ideal for punch and die work, gages and any general tool

work requiring inside shaping to close tolerance. The unit is very easy to handle and weighs no more than an ordinary milling machine vise.

The Dorden Mill-Shape Unit is rigidly constructed for long, dependable service. The only replaceable wearing parts are two bronze bushings. A vertical sliding ram is fitted to close tolerance to the main housing and, at the side, is provided with an adjustable gib to compensate for wear. The

illustration shows this unit mounted on a mill with one overarm bar, but different mountings are available for two bar or cast overarm machines. To adjust the stroke, slide off the sheet metal plate, loosen three screws on the eccentric and set to the desired stroke up to 3 inches. The speed of the Mill-Shape Unit is controlled by means of the milling machine.

For more data circle 104 on Reader Service Card

## ALL INFORMATION, METHODS, AND IDEAS NEEDED TO PRODUCE BETTER TOOLS AND DIES

Practical Data on Popular Analyses of Tool Steels,  
their Selection, Heat Treatment, and Use

in the Revised, Enlarged  
EIGHTEENTH PRINTING of this



# TOOL and DIE STEEL HANDBOOK

By Palmer and Luerksen

Here's the BOOK OF ANSWERS for every man responsible for tools and dies. Shows you how to increase your company's production from present equipment—how to reduce toolmaking trial and error, conserve tool steel, avoid die troubles, simplify heat treatment. Gives complete working information on everything from selection of the right steel to heat treating methods and equipment, hardness and toughness testing, latest data on high speed and hot work steels. 564 pages, 355 charts, photos, diagrams give you facts on: how design affects heat treatment, hardenability tests, time required to heat different tools to required hardening and drawing temperatures, furnace atmospheres, quenching, tempering, trouble-shooting.

INCLUDES 68-PAGE ALPHABETICAL SELECTOR SHOWING WHICH STEEL TO USE FOR ALMOST EVERY TOOL AND DIE. Use this book to train new men and upgrade skilled men.

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THE CARPENTER STEEL CO. • READING, PA. • DEPT. 3

Please send me, postpaid, your revised "Tool Steel Simplified". I enclose \$2.00 (\$2.50 outside U.S.A.) in full payment of the book.

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CITY \_\_\_\_\_ STATE \_\_\_\_\_

(Please print)

For more data circle 499 on Reader Service Card

## ELECTRICAL DISCHARGE MACHINE

Intricate outlines and contours, held to precise dimensions, can be cut through or sunk into hardened metal,

*If you use twist drills as fast  
as some folks chain smoke...*



*This brand cuts down your drill  
usage, production time and costs!*



*The more twist drills you use,  
the more you need Union*

Union also manufactures milling cutters, gear cutters, hobs, reamers and carbide tools. Available nationally through Union warehouses in Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York City, and San Francisco. S. W. CARD DIVISION, Mansfield, Mass.; BUTTERFIELD DIVISION, Derby Line, Vt.

# UNION

TWIST DRILL COMPANY, Athol, Massachusetts

**See Your UNION DISTRIBUTOR for cutting tools that will save you time and money**

For more data circle 500 on Reader Service Card

**new shop equipment . . .**

particularly in tool and die making with the Mark III Sparcatron equipment, which is available from Easco Products, P. O. Box 587, Ypsilanti, Mich. The work blank and an unhardened electrode, shaped to the desired outline are submerged in a dielectric bath in a tank that surrounds

them on the machine table. The work is secured to the table. The electrode is held in a chuck in the machine head and is automatically lowered, leaving a minute gap between it and the work surface.

A capacitor discharge power unit without electronic tubes, enclosed in a separate control cabinet, sends an electrical discharge through the electrode at ultra high repetitive frequency to

"spark machine" the hardened workpiece and reproduce the electrode outline and contours. The gap is maintained continuously by a servo control on the head. A pump circulates the dielectric between the table tank and a tank in the machine base to carry away the particles of eroded metal from the work and electrode as fast as they are formed.

The head stroke is a maximum of 3 inches for each setting. The machine table will take a 500 pound load. The head swings to one side on the 5 inch machine column to clear the 20 by 13 inch table tank for work change.

Control can be either manual or automatic. One to four machines can

*First  
and  
Foremost*

**NOBUR'S**  
*Job Tested*  
**TEAM**

*for*

★ **DEBURRING**  
★ **CHAMFERING**

*the NOBUR*



for machine  
deburring and  
chamfering of  
line-drilled and  
otherwise  
inaccessible  
hole surfaces.

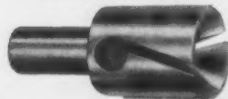
for the automatic  
deburring and  
chamfering of  
front and back  
hole faces  
simultaneously in  
sheet metal, etc.



*the NOBURMATIC*



*the NOBUROD*



for rapid  
deburring and  
chamfering the  
outer ends of  
rods, tubes  
and bosses.

for rapid  
deburring and  
chamfering  
openly accessible  
hole faces.



*the NOBURSINK*

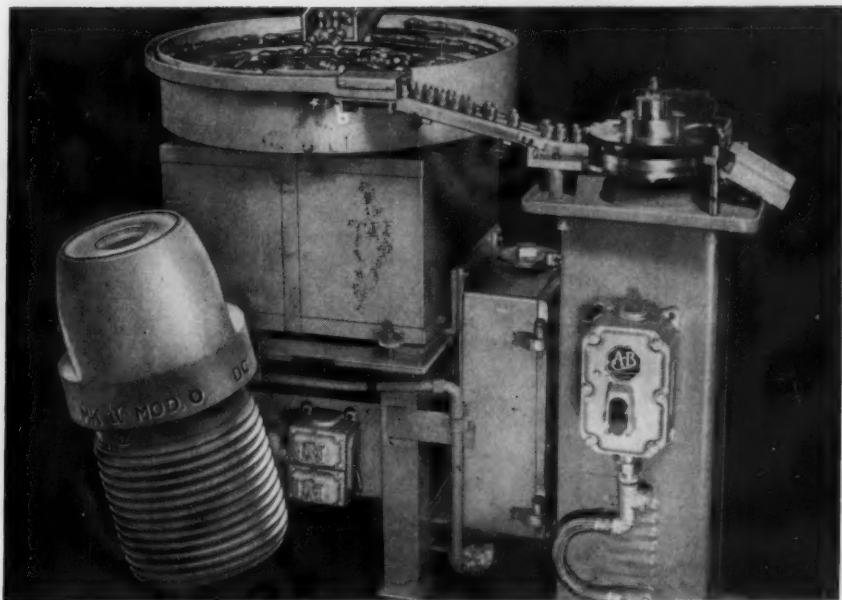


**NOBUR**

**MANUFACTURING CO.**

6860 Farndale Ave., No. Hollywood, California

For more data circle 501 on Reader Service Card



*Model 435—Speed-marks up to 7500 parts per hour.*

## AUTOMATION IN METAL MARKING

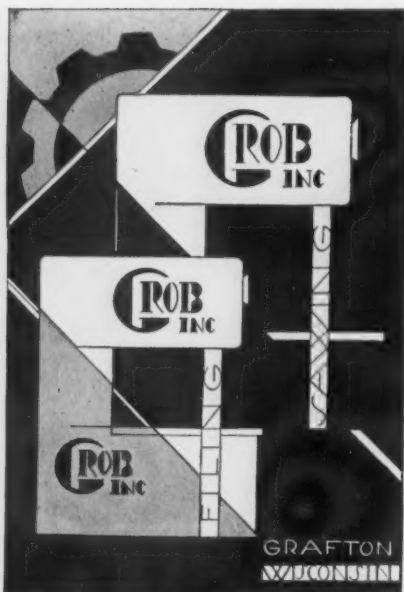
Here is the new NOBLEWEST hopper and dial-feed Roll-Marking Machine. With its fully automatic features, it is ideal for integrated line production. From a vibratory feeder, parts are fed to the machine, then *permanently* marked and automatically ejected. Can be used for *speed-marking* solid, round, heavy walled, or conical parts. Like all Noblewest Roll-Marking equipment, it produces permanently indented impressions . . . good for the life of your product . . . faster, better and at lower cost. Write for comprehensive new catalog. The Noble & Westbrook Manufacturing Co., 25 Westbrook Street, East Hartford 8, Connecticut.

MARK IT BEST WITH

 **NOBLEWEST**

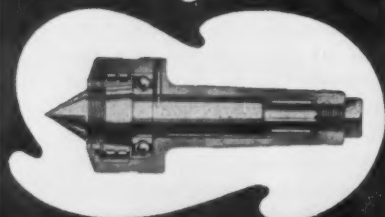
ORIGINATORS OF THE ROLL MARKING PROCESS

For more data circle 502 on Reader Service Card



For more data circle 503 on Reader Service Card

## NIELSEN Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog  
M on live centers

**NIELSEN, INC.** LAWTON,  
MICHIGAN

For more data circle 504 on Reader Service Card

### new shop equipment . . .



**Mark III Electrical Discharge Machine**

be operated from one main control power unit. Both main and auxiliary units can be operated independently. The auxiliary control cabinet has been designed to operate at the maximum power of the main control cabinet, which has been increased to 6.5 kw. Since micro switches are located at all strategic positions, these machines can be left unattended until the operation cycle is completed. The equipment is said to be particularly efficient when it is employed in the finishing operation on a tool after it has been rough machined and hardened.

For more data circle 105 on Reader Service Card

★ ★ ★

### OSCILLATING BASE FOR BENCH GRINDER

Any standard bench grinder can do precision tool sharpening with an oscillating base which is run by a belt drive from the grinder shaft. Tools are held in place on the steadyrest while the grinder is moved back and forth in a controlled stroke. The base is called Tru-Grind and is available from Gray-



*First* **COMPLETE LINE OF  
STANDARD END MILLS  
for ALUMINUM**

For further information on  
Putnam End Mills for Alumi-  
num, write for Catalog 457.

*Again* **PUTNAM LEADS...**

**Standard End Mills . . .** For the first time you can select from a complete line of standard end mills designed specifically for milling aluminum . . . Putnam stocks 185 standard types and sizes.

**New Designs . . .** These standard end mills have been developed through years of research and experience on aluminum applications. Over a year ago, Putnam introduced the first standard end mills designed for milling of aluminum. Today, no other manufacturer offers as complete a line of standard end mills for aluminum.

Contact your Putnam Distributor for personalized service,  
quick delivery of the finest standard end mills for aluminum.



**PUTNAM**

TOOL COMPANY

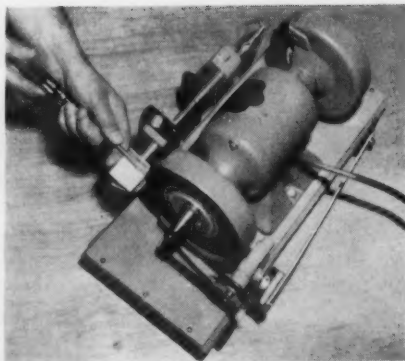
2981 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

For more data circle 505 on Reader Service Card

### new shop equipment . . .

bill Industries, Inc., 2907 North Monroe St., Spokane, Wash. This unit has been designed both for home workshops and for commercial grinding jobs. It is fully adjustable and will sharpen tool bits, joiner blades, lathe tools, plane blades, chisels and many other shop tools. Any grinder can be bolted to the base.

Stroke of the base can be adjusted from zero up to 6 inches, even while the grinder is in operation, through a two piece eccentric with a clutch disc. The belt drive operates the eccentric through a gear reduction system and a connecting arm from the outside section of the eccentric is attached to the lower base support frame. The upper



Tru-Grind Base installed under bench grinder

baseplate is moved across the frame on ball bearings and the length of stroke is determined by varying the position

# ENGINEERED

*Live Centers*

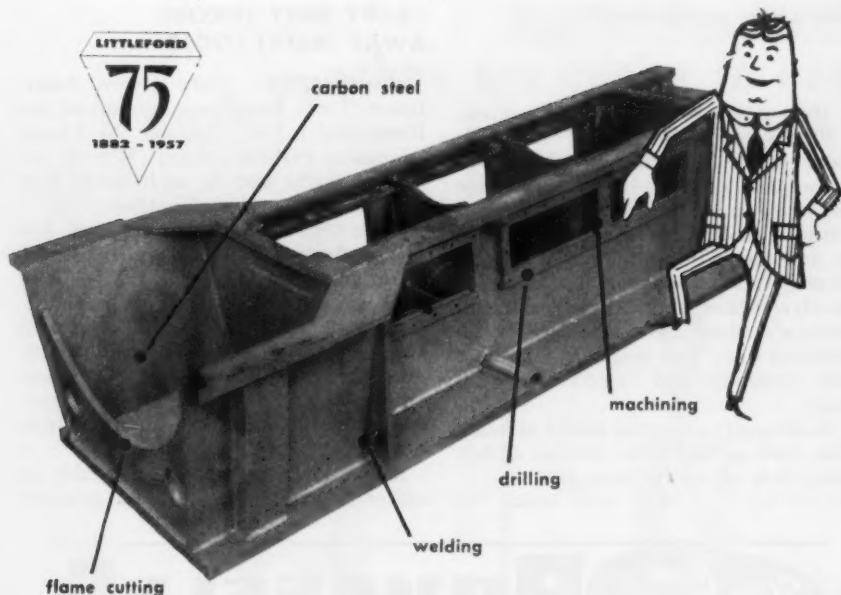
Standard shanks with Morse tapers carried in stock. Send us your specifications and blueprints — we will see that your job is set up with the right LIVE CENTER.

# STURDIMATIC

TOOL COMPANY

3904 F STREET • DETROIT 16, MICH.

For more data circle 506 on Reader Service Card



## **LITTLEFORD** saves you real money on bases, pans and guards . . .

Littleford's complete fabricating facilities free your plant and equipment for your own manufacturing specialty.

It's like *finding* a new building . . . with 175,000 sq. ft. of modern metal fabricating equipment.

You'll welcome this additional capacity that'll keep your assembly lines rolling.

And you'll profit from Littleford's 75 years experience.

Send us your blueprints today for prompt estimates.

**Littleford Bros., Inc., Dept. LB 262-  
433 E. Pearl Street, Cincinnati 2, Ohio**

For more data circle 507 on Reader Service Card

## new shop equipment . . .

of the outside section of the eccentric.

Steadyrests with an "all way" adjustment are attached to the lower frame. The unit provides a true edge and uniform bevel for sharpening of all types of tools. The unit is adjustable to any angle of grind and a special planer blade attachment fits on either steadyrest assembly. It provides full surface contact across the face of the grinding wheel and is said to eliminate any possibility of "grooving" the wheel.

A manually operated model is available, with a hand lever instead of belt drive and adjustable eccentric.

For more data circle 106 on Reader Service Card

## HEAVY DUTY THROW AWAY INSERT TOOLS

Kendex Heavy Duty Throw Away Insert Tools have been announced by Kennametal, Inc., Latrobe, Pa. Large triangular carbide inserts ( $\frac{5}{8}$  inch inscribed circle and  $\frac{1}{4}$  inch thick) are used in three styles of holders.

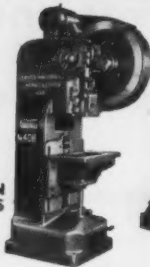
Style KTD-86A Holders are for heavy plunge cutting on tracer control or automatic lathes. Style KTF-86A is for turning or facing to a square shoulder. Style KTG-86A is an offset tool for shaft turning or facing to a square shoulder. All holders are of heat treated alloy steel and have a hardened steel clamp and solid carbide shim or seat.

Kennametal Inserts are available in either precision (all surfaces ground)

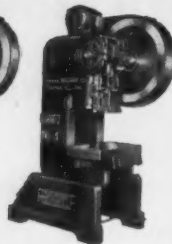
*You Can Rely on a* **ROUSSELLE**



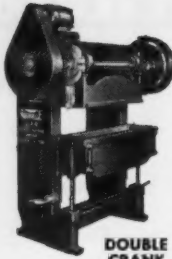
**DEEP THROAT PRESS**



**HORN PRESS**



**O.B.I. PRESS**



**DOUBLE CRANK PRESS**

## THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

Manufacturers of Rousselle Presses

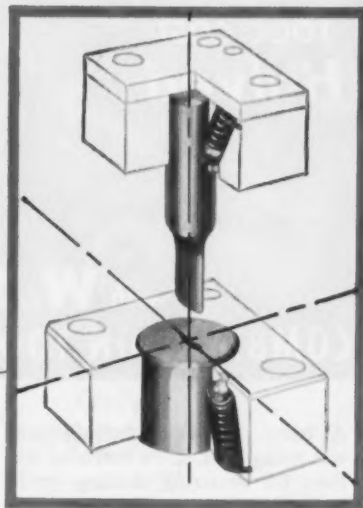
Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

Choice of 25 models in 5 to 40-ton sizes.

**SERVICE MACHINE CO.** 2310 West 78th Street • Chicago 20, Ill.

# WHY R-B Punches are easier to use



Just a push, a twist, and "click" your R-B punch or die button is accurately **ALIGNED** and **LOCKED** in place. The R-B ball lock prevents radial or vertical movement of the punch or die button in the retainer—no additional keying is required. R-B punches and die buttons are just as easy to remove—simply insert tanged tool in retainer hole to release ball lock. Standardized and completely interchangeable in any shape or size, these easy to use punches and die buttons save your time and energy.

No other manufacturer of punches and die buttons can offer you the amount of successful application experience and the scope of knowledge that is available from the R-B engineering staff for:

- ★ Cutting Your Production Costs
- ★ Reducing Die Designing Time
- ★ Increasing Productivity of Presses
- ★ Supplying Answers to Piercing Problems
- ★ Saving Die Construction Time
- ★ Complete Standardization of Press Tooling



For Additional Information or Engineering Service, Write to:

**RICHARD BROTHERS PUNCH DIVISION**

**ALLIED PRODUCTS CORPORATION**

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For more data circle 509 on Reader Service Card

PRODUCTION

**Tripled**

TOOL COST

**Halved**with **W & S**  
**COMBINATION TOOL**

A home appliance manufacturer was using four screw-machine stations for centering, drilling, counterboring and reaming for brass components. To increase output of the machines, Woodruff & Stokes was asked to design a combination tool to center, drill, counterbore and ream *in one operation*. The resulting tool cost half as much as the four tools it replaced, cut production time by two-thirds, by making double indexing possible.

*Chances are, a tool designed by W & S small tool specialists can streamline your own production. Our tool specification sheet makes it easy for you to find out.*

**WOODRUFF & STOKES CO.**  
INCORPORATEDBldg. 32, 353 Lincoln St.,  
Hingham, Massachusetts

For more data circle 510 on Reader Service Card

250 modern machine shop

**new shop equipment . . .****Kendex Heavy Duty Throw Away Insert Tool**

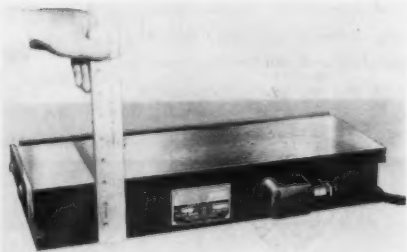
or utility (ground top and bottom) types. They are stocked in a number of grades. Chip breakers are available separately from the manufacturer.

For more data circle 107 on Reader Service Card

★ ★ ★

**MAGNETIC CHUCK FEATURES  
LOW HEIGHT**

An electromagnetic chuck only 2 7/8 inches high has been announced by Hanchett Magna-Lock Corp., 472 Maple St., Big Rapids, Mich. Designated as the Model CL, this chuck provides maximum working height under the grinding wheel. The Model CL is available in seven sizes: 5 by 10, 6 by 12, 6 by 18, 8 by 18, 8 by 24, 10 by 15 and 10 by 16 inches. The Model CL has a fine pole laminated top and all steel welded precision construction.

**Hanchett Model CL Electromagnetic Chuck**

November, 1957



# NOW

**you can afford  
rapid, precision  
optical inspection**



## COVEL

### *Optical* **COMPARATOR**

**Only  
\$985<sup>00</sup>**

Now every shop can enjoy the advantages of precision optical gaging and inspection. Covell No. 14 Optical Comparator outmodes mechanical checking methods, prevents costly errors, saves time and money!

The Covell Comparator is easy to use, even in brightly lighted shop areas. Has large 14" diameter screen and 6" horizontal stage travel. Rugged, precision construction throughout.

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DESCRIPTIVE  
BULLETIN MM-117**

**COVEL** | **PRECISION  
GRINDERS**  
BENTON HARBOR, MICHIGAN

**COVEL OFFERS THE WIDEST  
CHOICE IN SURFACE GRINDERS  
UP TO 14"x24". CUTTER AND  
TOOL GRINDERS. DRILL GRIND-  
ERS. OPTICAL COMPARATORS.**

For more data circle 511 on Reader Service Card

### new shop equipment . . .

Holding power is uniformly distributed to the extreme edges of the faceplate. It is moisture proof and shock proof. The Model CL is furnished complete with rectifier and built in switch. Simply plug it into an a.c. line and the work can then begin.

For more data circle 108 on Reader Service Card

### KNUCKLE JOINT EMBOSSING PRESSES MADE MORE PRODUCTIVE

A line of Minster Series 90 Knuckle Joint Presses, ranging in capacity from 150 to 1,000 tons for mass production coining, sizing and embossing operations, has been made more productive by the Minster Machine Co., Minster, Ohio. Greater parts accuracy and longer press life are said to be attained by precision building of the knuckle assembly, adjusting wedge, frame members, slide and gibs.

The location of the combination air friction clutch and brake on the crankshaft within the main drive gear makes higher single cycle efficiency possible. Production is increased because it is possible to get more single

cycle production. The location of the combination air friction clutch and brake on the crankshaft within the main drive gear makes higher single cycle efficiency possible. Production is increased because it is possible to get more single

**"Cuts Installation Costs 80%"**



**this here**

**SAVES** 80% on machine installation costs (Am. Type Founders)  
20% on production-labor costs (Colo. Fuel & Iron Corp.)

*Here are three reasons Barry Mounts  
will give YOU these savings:*

**You don't have to drill floors, set anchors, and lag down machines.**

Just put a Barry Leveling Mount on each machine foot and set the machine right where you want it. The built-in vibration control won't let the machine "walk".

**You can easily move any machine — anywhere.**

All you do is pick it up and set it down in its new location. It's back in production in minutes.

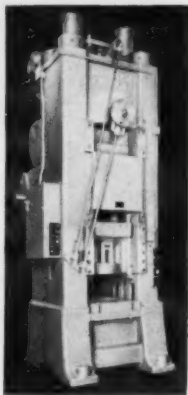
**You don't have to fuss with shims to get the machine level.**

Just turn Barry-mount leveling screws and tighten locknuts.

**Ask for: Reprint of "The Iron Age" report on proved savings;  
Plant-survey Chart showing cure for 8 production losses.**

**BARRY CONTROLS** incorporated, 783 Pleasant St., Watertown, Mass.

For more data circle 512 on Reader Service Card



**Minster Knuckle Joint  
Embossing Press**

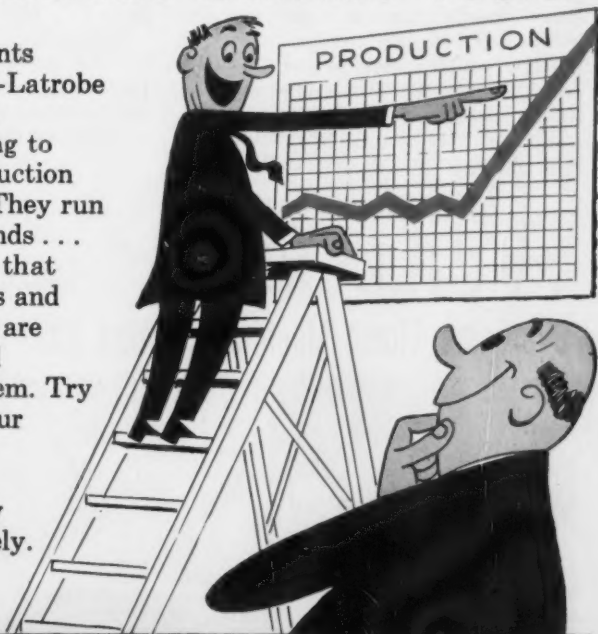
For more data circle 511 on Reader Service Card

November, 1957

modern machine shop 251

# "...then we switched to Chicago-Latrobe Carbide Tools"

In hundreds of plants and shops, Chicago-Latrobe Carbide Drills and Reamers are helping to establish new production records. Reason? They run longer between grinds . . . they have stamina that permits faster feeds and speeds. And—they are available when and where you need them. Try them . . . call in your Chicago-Latrobe Distributor. He'll serve you promptly . . . advise you wisely.



## Chicago-Latrobe

CARBIDE

## Drills and Reamers

FROM YOUR C-L DISTRIBUTOR

DRILLS • REAMERS • COUNTERSINKS • COUNTERBORES  
GUN DRILLS • CARBIDE AND SPECIAL TOOLS

**CHICAGO-LATROBE**

419 W. ONTARIO STREET, CHICAGO 10

Offices and Warehouses in: New York, Detroit, Chicago, Los Angeles



ASK for: Reprint of "The Iron Age" report on proved savings;  
Plant-survey Chart showing cure for 8 production losses.

**BARRY CONTROLS** Incorporated, 783 Pleasant St., Watertown, Mass.

For more data circle 512 on Reader Service Card

252 modern machine shop

**Minster Knuckle Joint  
Embossing Press**

November, 1957

### new shop equipment . . .

stroke operations per minute. Higher press speeds, also a result of the clutch location, give greater velocity of impact, which tends to increase the flow of metal in cavity type dies or sizing operations.

The recirculating oil lubrication system, standard on all of these presses,

supplies oil under pressure to instantly replenish oil film on all wear surfaces after every stroke. This feature allows close clearances for increased precision, less wear and long life.

A cast steel knuckle assembly, nearly solid cast iron frames and the four piece tie rod construction give these presses the compressive strength and rigidity required to withstand the tremendous forces of knuckle joint type operations.

Another standard feature of these embossing presses is a top block lock arrangement that is claimed to prevent a change in slide adjustment which would cause excessive ton-nages, incorrect parts dimensions and damage to the machine.

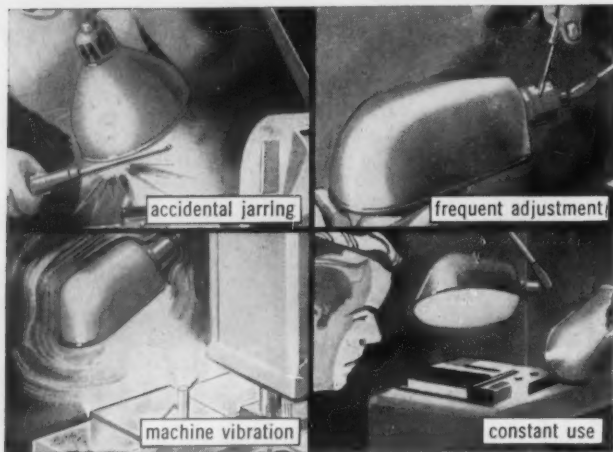
The slide adjusting wedge is located so that thrust is exerted toward the rear of the machine. It is dovetailed into, and trapped within, the confines of the crown.

Adjustment of this precision fitted wedge, as well as that of the top block lock, is made by means of a ratchet wrench, directly at operator level, through miter gear shafts.

For more data circle 108 on Reader Service Card

## McGILL® Levolier® Sockets

### Overcome These Machine Lighting Hazards



#### THESE FEATURES CUT REPLACEMENT AND MAINTENANCE COSTS:

- Levolier® switch—the most dependable switch made
- Heavier than standard screw shell
- Double thick, impact resisting cap and casing of self insulating molded phenolic

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Valparaiso, Indiana

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**CHICAGO - LATROBE**

419 W. ONTARIO STREET, CHICAGO 10

Offices and Warehouses in: New York, Detroit, Chicago, Los Angeles

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## STARRETT PRECISION MAKES GOOD PRODUCTS BETTER



### Features pioneered by Starrett include:

- Balanced Design
- Satin Chrome Finish
- One-piece spindle construction
- Hardened and ground threads
- Rigid one-piece frame
- Quick-reading figures
- Simple sleeve adjustment with Hi-Micro finish on anvil and spindle faces (Carbide faces also available)

## STARRETT MICROMETER CALIPERS

for guaranteed accuracy, longer life, lower costs

In buying a micrometer, utmost reliability is the first consideration. The name Starrett, representing more than 75 years of specialized know-how in micrometer manufacture, is the best guarantee of quality and precision.

All Starrett micrometers offer the above features that insure better, faster precision measuring with lasting accuracy... the only safe way to reduce tool costs and lower production costs.

Starrett Satin Chrome Micrometer Calipers are made in a complete range of styles and sizes from  $\frac{1}{2}$  to 168 inches in full finish and black frame types

... also tubular micrometers, inside micrometer calipers, micrometer depth gages and a wide variety of special purpose micrometers.

Your Industrial Supply Distributor can furnish the right Starrett micrometers for your precision measuring needs. Call him for quality products, dependable service. Or send for the big new Starrett Catalog which illustrates the complete line. Address Dept. MD, The L. S. Starrett Company, Athol, Massachusetts, U. S. A.

# Starrett®

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World's Greatest Toolmakers



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254 modern machine shop

directly at operator level, through miter gear shafts.  
 For more data circle 105 on Reader Service Card

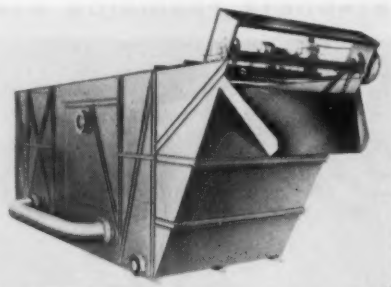
November, 1957

## new shop equipment . . .

### CAPACITY OF VACUUM FILTER INCREASED TO 1,000 G.P.M.

Industrial Filtration Co., Dept. FMH-506, 13 Industrial Ave., Lebanon, Ind., recently announced that its Delpark Tubular Screen Vacuum Filter has been increased in capacity to handle flow rates to 1,000 g.p.m. on water. Designed specifically for the filtration of grinding coolants and cutting oils, the Filter-Matic makes micro inch finishes more easily attainable.

Filtration is accomplished by tubular screen elements manifolded into a suction header box in which a vacuum equivalent to 18 inches of mercury, is maintained. Automatic, self-cleaning is accomplished by a float activated micro switch which energizes an air valve and cylinder and reverses the coolant flow through a four way valve. Filter-



*Delpark Tubular Screen Vacuum Filter*

ed coolant from a reservoir is forced back through the manifold into the tubes, knocking off the filtered deposits held on the periphery of the tubular screens.

The sediment from the screens is removed by chain driven flights, which deposit the sludge in a tote box for disposal. The flow of coolant to or from the filter is not interrupted during the cleaning cycle. Filter aids may

★ ★ ★ ★ ★

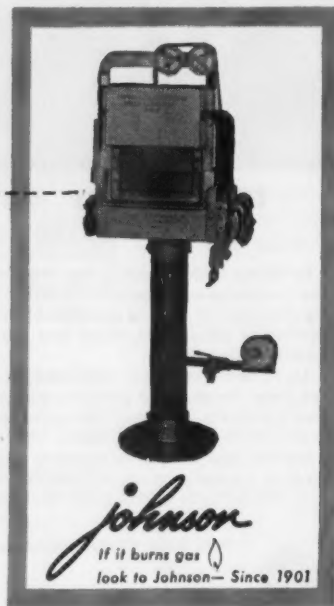
## HEATS FAST SAVES TIME

*johnson*  
 NUMBER 142 HEAT TREATING FURNACE

Powerful burners in this efficient furnace get heat up to the 1300°-2350° F. range in minutes. Temperatures accurately and quickly regulated. Does fast job with high speed and carbon steels. Ratchet-operated door opens upward. High temperature, refractory-lined firebox is 7" by 13" by 16½". 200,000 BTUs per hour. Carbofrax hearth, G.E. Motor and Johnson Blower included, F.O.B. Factory .... \$358.00  
 Write today for free Johnson Catalog

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*johnson*  
 If it burns gas look to Johnson—Since 1901





Visit Booth 1730, National Metals Show

**PRECISION TOOLS**

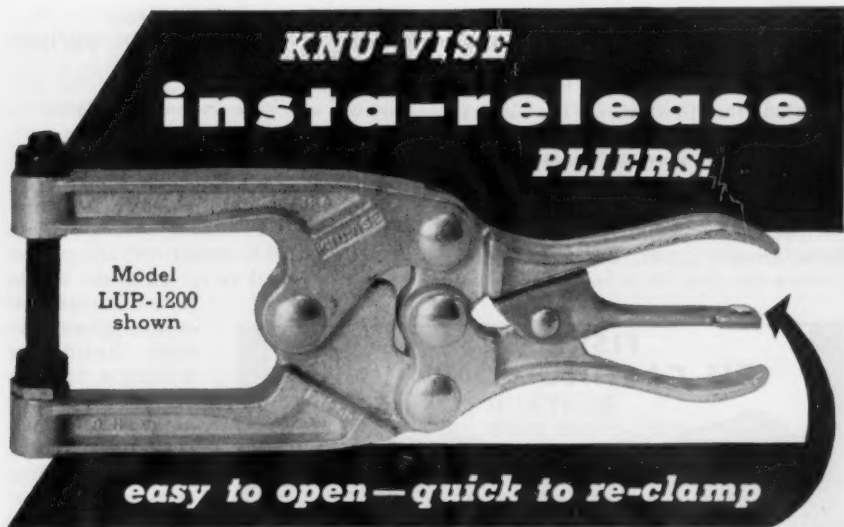
World's Greatest Toolmakers

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November, 1957

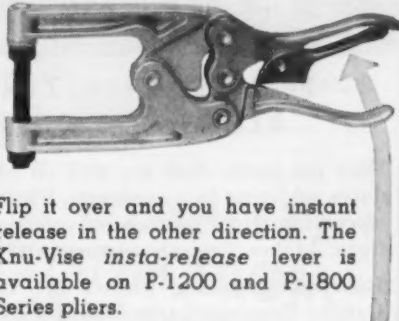
modern machine shop 255



**insta-release**—that's the name for the easy-action release-lever Knu-Vise pliers. Pliers open instantly; re-clamp quickly—easily—without waste motion.



Maintains control over the free-swinging handle—permitting re-clamping with the same grip. Always remains within the hand span of the user.



Flip it over and you have instant release in the other direction. The Knu-Vise *insta-release* lever is available on P-1200 and P-1800 Series pliers.

**Remember:** Every model of the more than 150 *Knu-Vise* clamps is quick to lock—and quick to open. Ask for a demonstration.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

**KNU-VISE  
PRODUCTS**

**LAPEER MANUFACTURING CO.**

3048 DAVISON ROAD

LAPEER, MICHIGAN

WESTERN DIV.: 419 Magnolia, Glendale, Calif. • CANADIAN DIV.: Higginson Equip. Sales, Ltd., Burlington, Ont.

For more data circle 517 on Reader Service Card

November, 1957

modern machine shop 257

Max heat, G.E. Motor and Johnson  
Blower included, F.O.B. Factory .... \$358.00  
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256

modern machine shop

**Johnson**  
If it burns gas  
look to Johnson— Since 1901

November, 1957

### **new shop equipment . . .**

be used for precoating the screens when absolute filtration is required. An automatic precoat feeder is supplied as optional equipment. Multiple units are used for recommended capacities over 1,000 g.p.m. Smaller units, from 5 g.p.m., are available.

For more data circle 110 on Reader Service Card

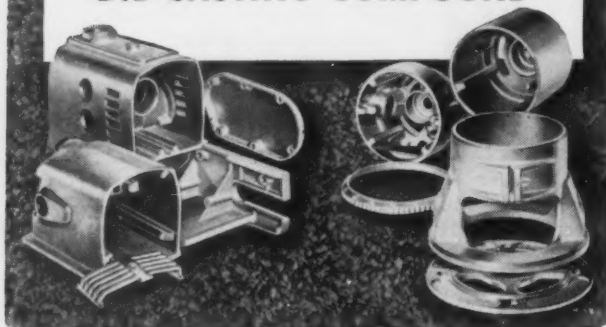
### **DRILLING AND TAPPING MACHINE HAS 21 INCH SWING**

A 21 inch swing upright drilling and tapping machine is now available in box and round column types in both single spindle models and gang drills from Cleereman Machine Tool Corp., 555 West Washington Blvd., Chicago 6, Ill. The Cleereman Model N has been designed to speed operations and handle a broad range of work. Single

lever functional control gives fast, easy handling. Spindle speeds and feeds can be arranged for practically any job. A unique design feature not only permits unlimited feed rates, but also provides all standard geared tap leads from 8 to 50 pitch. A line of attachments is available.

For more data circle 111 on Reader Service Card

### **FISKE'S 231 DIE CASTING COMPOUND**



### **FOR CLEANER ZINC AND ALUMINUM CASTINGS**

Does not fume, flash nor give off offensive odors. Reduces soldering to a minimum. Produces clean, smooth pieces free from surface imperfections and discolorations. Makes stronger castings and increases die life.

Bulletins describing Fiske's 231 Die Casting Compound and other specialty lubricants and coolants sent on request.

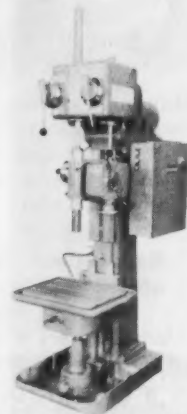


**METAL WORKING  
LUBRICANTS**

**FISKE BROTHERS REFINING CO.**

Newark 5, N. J. and Toledo 5, Ohio

For more data circle 518 on Reader Service Card



**Cleereman Drilling  
and Tapping Machine**

258

modern machine shop

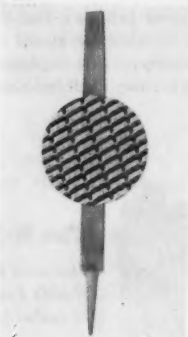
November, 1957

## MACHINIST'S FILE FOR FERROUS AND NON-FERROUS METALS

Magicut is the name of the all purpose machinist's file recently announced by Nicholson File Co., Providence, R. I. Designed for use on both ferrous and non-ferrous metals, Magicut has coarse single cut teeth, interrupted by long, narrow chip breakers which create hundreds of individual chisel-like scallops. Rapid stock removal and a smooth finish are created simultaneously. This file is effective on stainless steel, carbon tool steels and a wide variety of non-ferrous type metals.

Magicut is being made in flat, half round and square shapes. Lengths are 8, 10, 12 and 14 inches.

For more data circle 112 on Reader Service Card



Magicut All Purpose  
Machinist's File

## STEEL WEIGHT FINDER AND SLIDE RULE

The Steel Weight Finder, one side of which is shown in the accompanying illustration, is an instrument designed and developed for the steel industry by the Alcott Calculator Co., Dept. MMS, P. O. Box 4606, Fort Lauderdale, Florida.

It enables the user to quickly and

**DUSTKOP STOPS DUST**

**DUST COLLECTORS**

**PLUS... ACCESSORIES OR FITTINGS**

**A COMPLETE SYSTEM FROM ONE SOURCE**

*Aget offers more! Over 38 standard Dustkop models to choose from . . . Plus engineering service to help you select, provide, and install the proper accessories and fittings to complete your dust collecting system. Write for illustrated folder . . . Today!*

## AGET MANUFACTURING COMPANY

1398E. CHURCH STREET • ADRIAN, MICHIGAN

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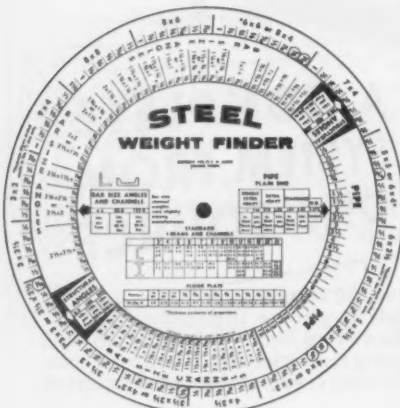
# new shop equipment . . .

accurately determine the exact weights of a variety of steel products. There are over 1,000 items contained on this compact slide chart including steel angles, beams, channels, flats, rounds, squares, hexagons and strip. Also given are the weights of steel sheets (H.R., C.R. and galvanized), smooth plate, floor plate, concrete reinforcing bars and pipe.

The Steel Weight Finder is a time-saver to anyone who buys, sells or uses steel. Steel salesmen, estimators, engineers, fabricators and manufacturers are among those who can benefit from this durable instrument.

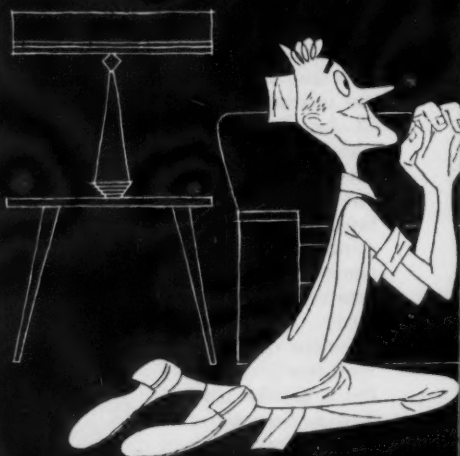
An important feature of the Weight Finder is that all of the answers are given exactly as they are shown in Standard Weight Tables. The scale system, requiring estimation, is not used.

The Steel Weight Finder is 8½ inches in diameter and will fit into any standard notebook or brief case. It is small enough to be easily carried, yet large enough to permit easy reading.



Alcott Steel Weight Finder and Slide Rule

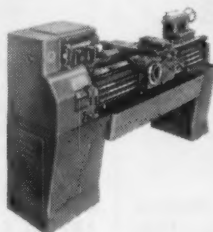
# Turning Terminology (as visualized by Tom the Trainee)



## "ENGAGING THE HALF-NUT"

The closest Tom will come to marrying the half-nut will be to fall in love with a new LeBlond Regal Lathe. The low-cost Regal offers many advantages usually found only in more expensive lathes.

The head-stock has the same combination gear-belt drive proved so successful in LeBlond's Dual-Drive and Heavy Duty lathes. Hardened and ground steel ways with compensating veeway principle distribute forces for long life and lasting accuracy. Both feed rod and lead



## The R. K. LeBlond Machine Company

Cincinnati 8, Ohio  
World's Largest Builder  
of Lathes for More than 70 Years

For more data circle 52 on Reader Service Card

Simply set the arrow on the desired item. The answer then appears in bold, easy-to-read type in the convenient window.

For more data circle 299 on Reader Service Card

★ ★ ★

### ABRASIVE WHEEL CUT-OFF SAW DESIGNED FOR FERROUS METALS

Backus Machine Works, 430 Route 17, Carlstadt, N. J., has announced an abrasive wheel cut-off saw for ferrous metals. Made for high speed, high accuracy cutting of small bars, shapes, tubing and pipe of steel, alloys or other ferrous materials, the Backus Saw has a quick removable guard for easy changing of wheels. An opening in the table allows short cut pieces to drop into a container below, thus reducing handling and hazards.

Among its features, the saw has a standard make motor, accurate work stop, quick action vice, plus specially engineered leverage that gives the operator maximum feel. This Model R-1000-A is already machined for adaptation to the Backus Conversion Unit to handle both ferrous and non-ferrous cutting.

For more data circle 300 on Reader Service Card

★ ★ ★

### GEAR CLASSIFIER SORTS GEARS INTO ACCURATE SIZE RANGES

The Red Ring Model GRF Automated Electronic Gear Classifier, that sorts gears into size ranges for assembly operations, has been announced by National Broach and Machine Co., 5600 St. Jean, Detroit 13, Mich. The machine is ideally adapted to the production of gears, such as those used in planetary and related types of gear



screw give the Regal enduring accuracy for thread chasing.

These low-cost lathes with big-lathe features are the product of 70 years of machine tool experience, combined with the facilities of a plant which builds a complete line of 76 lathe models. Ideal for light production, maintenance and training.

Available in 13", 15", 17", 19", 21" and 24" sizes, plus a 13" bench model.



WRITE FOR BULLETIN R-201-Y

**LeBlond and Machine Tool Company**



of a Complete Line  
70 Years

Reader Service Card

## "Do-It-Yourself" Saves Hours Cuts Costs



Why let someone else set your production schedules? If you now depend on outside heat treat sources, consider all the advantages of heat treating tools, dies, parts, etc., right in your own shop with a versatile TEMCO electric furnace. No bother with time-wasting pickup and delivery of work...no downtime while waiting for it to come back. Saves hours on jobs. Cuts costs...for TEMCO furnaces are economical to own and operate. Easy to hook up...easy to use. (Shown above is Type 1600 with TEMCOMETER-type controls in new cabinet assembly). The TEMCO line includes eighteen models with chamber sizes from 4" x 3 3/4" x 4 1/4" to 10" x 9 1/2" x 22". \$65.00 to \$973.25 complete with controls. Write for data and nearest dealer's name.



**ELECTRIC FURNACES**  
Thermo Electric Manufacturing Co.  
488 Huff St., Dubuque, Iowa

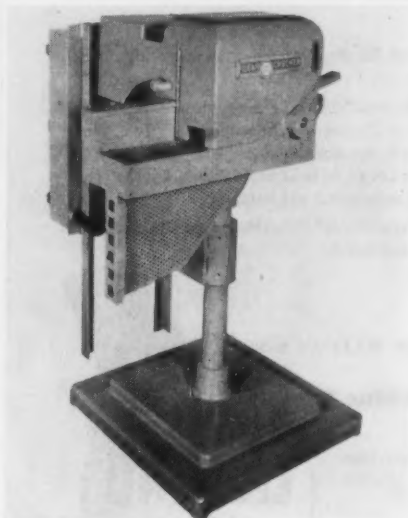
For more data circle 522 on Reader Service Card

## new shop equipment . . .

sets, where equalized backlash and loading conditions are desired in finished assemblies.

Extreme accuracy of size measurement in this gaging machine is achieved by utilizing a double pivoted mounting for the upper non-rotating master gear. This arrangement permits true size measurement of spur or helical gears to be made regardless of helix angle variations. Another feature contributing to extreme accuracy of the unit is the synchronized engagement of the same tooth of the motor driven lower master with each gear to be measured. This arrangement completely eliminates the effect of minute master gear tooth or shaft bearing eccentricities. Both upper and lower master gears can be rotated to new tooth meshing positions.

The model shown in the accompanying illustration measures 1 inch di-



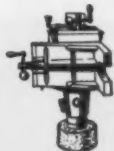
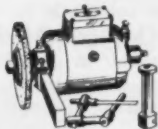
Red Ring Electronic Gear Classifier





**GENERAL  
PURPOSE**

**TOOL  
POST**



**VERTICAL  
SPINDLE**

## GRINDERS ... DRILLS

**T**hese superb electrical grinders and drills set the pace for highest quality and efficiency . . . and for amazing savings in cost and maintenance.

Preferred by industry everywhere!

*Attractively Priced*  
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**United States  
Electrical Tools**

*Over 60 years of Service to Industry*



**1/4" TO 1 1/2"**



**PRECISION LATHE**

## GRINDERS AND DRILLS

United States Electrical Tools are electrically and mechanically correct.

**ALL ROTATING PARTS AND SPINDLES ARE PRECISION - BALANCED DYNAMICALLY BY LATEST ELECTRONIC EQUIPMENT.**

**The United States Electrical Tool Co.**

3640 LLEWELLYN ST., CINCINNATI 23, OHIO

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For more data circle 522 on Reader Service Card

262 modern machine shop

November, 1957

**new shop equipment . . .**

ameter helical automotive automatic transmission pinions and classifies them into undersize, oversize and four tooth size ranges, each differing from the other by 0.0004 inch tooth thickness measured over pins.

Pinions are fed into the classifier from the production line. The size measurement is made by passing each

pinion between a pair of master gears. Center distance movement of the upper master gear, as each pinion passes through, is measured by a sensing unit of the linear variable differential transformer type. Electronic controls amplify the signal from the transformer and cause solenoids to open a door in the exit chute of the classifier which corresponds to a particular size reading. Thus, the pinions are automatically measured, classified and direct-

WILSON "ROCKWELL"—  
THE WORLD'S STANDARD OF HARDNESS TESTING ACCURACY

WILSON "ROCKWELL"

→

DIAMOND  
"BRALE" PENETRATORS



**Your hardness testing is no better than the penetrator**

A FULL WILSON LINE  
TO MEET EVERY HARDNESS  
TESTING REQUIREMENT

FULLY AUTOMATIC

• SEMI-AUTOMATIC

• REGULAR

• SPECIAL

• SUPERFICIAL

TUKON MICRO & MACRO  
HARDNESS TESTERS

**Every WILSON Diamond "BRALE" Penetrator gives you:**

a flawless diamond • no chips, no cracks  
precise accuracy of penetrator angle

Microscopic inspection finds and rejects any diamond with the slightest imperfection... comparator check, with hundreds of magnifications, assures essential accuracy and uniformity of penetrator angle... your complete assurance of—

Accurate measurements • No rejection of good parts

No keeping of sub-standard parts

No risking good name with customers

The matching accuracy of WILSON Diamond "BRALE" Penetrators and "ROCKWELL" Hardness Testers, insure perfect hardness testing... EVERY TIME.

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for Better  
Values

**WILSON**

MECHANICAL INSTRUMENT DIVISION  
AMERICAN CHAIN & CABLE

230-G Park Avenue, New York 17, N.Y.

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**ACCO**



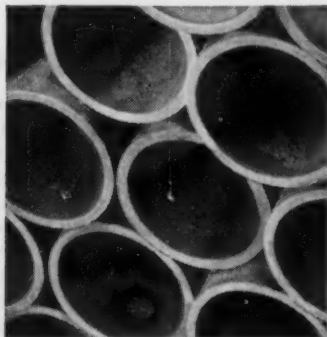


Abrasive Cutting Wheels

## Abrasive Cutting Know-How

Know-How is just as vital to top performance in abrasive cutting as in any other machine tool operation

### BETTER TUBING CUT-OFFS UP TO 14" DIAMETER



Pictured here is a close-up of part of a production run of tubing cut with an Allison Abrasive Cutting Wheel

**NOTE—**

- Smooth, Burr-Free Cuts
- Absolute Minimum Burr
- No Distortion of Tubing

• The fastest, lowest-cost, highest-quality cut-offs of almost any tubing material, in sizes up to 14" diameter, can be obtained by abrasive cutting...with absolute minimum of burr.

But such performance on your individual tube-cutting job is dependent on your use of the particular type and grade of abrasive wheel that provides the best balance for such inevitable variables as...available equipment...material to be cut...cutting speed...desired quality of cut...and finally, wheel life.

**The full line of Allison Wheels**...rubber or resinoid bonded for wet or dry cut...includes many wheels that are especially designed for Tube Cutting Service.

**Allison Field Men**...all of them Abrasive Cutting Specialists...have the specialized Know-How, and the wheels, to help you arrive at the best answers to your specific problems. Please ask for their help, without obligation.

**Abrasive Cut-Off is the Ideal Method** for tubing...tool rooms...job shops...high temperature alloys and tough titanium...heat-sensitive metals...solids up to 12" billets and many other jobs.



For more complete information write for this helpful booklet—  
**ABRASIVE CUTTING BY ALLISON**

### ALLISON DIVISION • American Chain & Cable

254-D Island Brook Avenue, Bridgeport 8, Conn.

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**free!**

1957

**MONTGOMERY TOOLS**

**32** NEW and improved  
TIME SAVING  
TOOLS AND METHODS  
FOR THE  
MACHINE AND TOOL  
INDUSTRY

SINCE 1876

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71 TICHENOR LANE • NEWARK 2, N. J.

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## LET HIGH-SPEED KNOW-HOW

- Increase Production
- Reduce Costs • Improve Quality

### —NEW, NOISELESS RIVET SPINNER

The new noiseless, motor-driven Rivet Spinner is the latest addition to the High Speed Hammer line of cold riveting machines and stakers. Has rivet capacity to  $\frac{5}{16}$ " diameter, spindle travel  $\frac{3}{4}$ " adjustable downward. Two models . . . floor or bench, designed for either foot or air operation. Produces absolutely uniform assemblies at every cycle, increases operator's efficiency. Air operated model eliminates fatigue. High Speed Hammer provides **FREE ASSEMBLY ENGINEERING SERVICE**. Send parts and/or prints. We'll recommend the right operation covering tools, procedure, cost estimate and equipment to use. No cost or obligation.

### HIGH SPEED HAMMER CO., INC.

315 Morlan St., Rochwater 21, N. Y.

We have the most complete line of riveting machinery and can recommend the correct type machine, tooled and ready, to go into operation upon receipt.

For more data circle 527 on Reader Service Card

## new shop equipment . . .

ed into the proper size chutes for the subsequent assembly operation.

For more data circle 113 on Reader Service Card

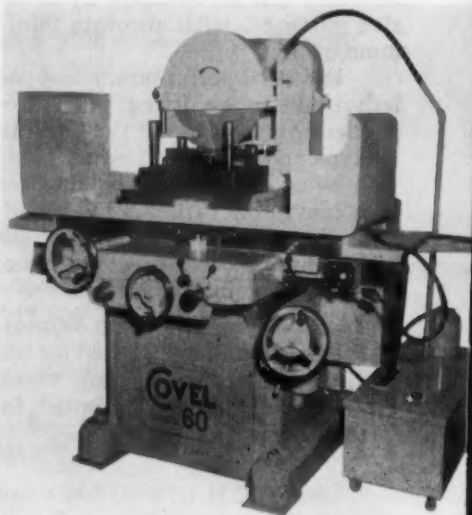
★ ★ ★

## SURFACE GRINDER EQUIPPED WITH 20 INCH GRINDING WHEEL

Covel Manufacturing Co., Benton Harbor, Mich., has announced that its No. 60, 14 by 24 inch Hydraulic Surface Grinder can now be equipped with a special wheel hood, spindle drive and 20 inch diameter grinding wheel. Normally this machine carries a 14 inch diameter wheel. However, in this case the user wanted to grind dies without removing the guide pins.

Rapid traverse is also provided for quick positioning of the table or for dressing the wheel from the chuck.

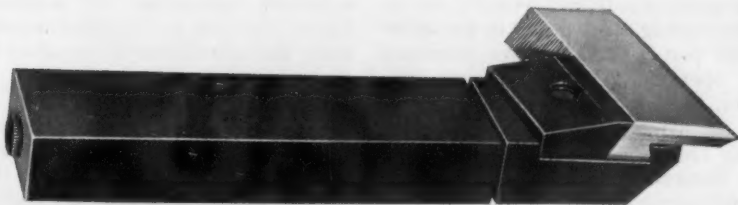
For more data circle 114 on Reader Service Card



Covel No. 60 Hydraulic Surface Grinder

# Economy, Versatility, Efficiency

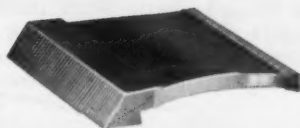
**FOR CUTTING-OFF, THREADING, FORMING, GROOVING**



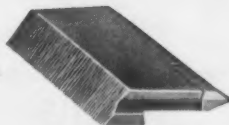
## RAPIDOR TURNING TOOLS

"Razor blade" economy, multi-job versatility, time-saving efficiency . . . these are just a few of the important advantages you get with Rapidor *changeable blade* turning tools. And, chances are, the Rapidor you need . . . whether for cutting-off, threading, forming or grooving . . . is available from standard stock. (Blades for grooving "O" rings and retaining rings are available.) Bokum will also design and build "specials" to your specific requirements. Want more information? Write for literature today.

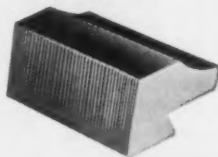
**Dept. B**



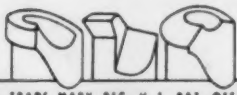
**CUTTING-OFF**



**THREADING**



**FORMING AND GROOVING**



TRADE MARK REG. U. S. PAT. OFF.

**BOKUM TOOL CO. INC.**

**14775 Wildemere Ave.  
Detroit 38, Mich.**

For more data circle 528 on Reader Service Card

## new shop equipment . . .

### AUTOMATIC TOOL ADJUSTMENT IN AUTOMATION LINE

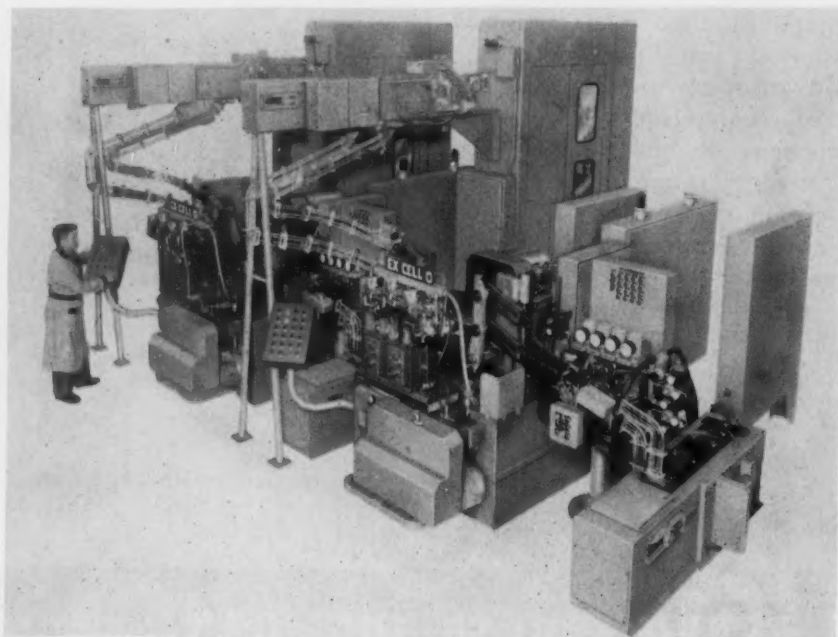
An automation line, recently set up for producing steel gears in an automobile plant, includes two standard cam operated precision boring machines, built by Ex-Cell-O Corp., Detroit 32, Mich. These machines incorporate not only automatic work handling equipment, but also automatic tool adjustment controlled by air gages to compensate for tool wear.

Operations on these machines include finishing the entire blanks prior to cutting the gear teeth. Work includes precision boring the i.d., turning the o.d., facing both sides and chamfering the edges. Parts are gaged before and

after each operation. The first is a check to prevent oversize parts from entering the machine. Any such parts are rejected automatically. When the work leaves the machines, the blanks are gaged again and, as dimensions approach minimum or maximum limits, the tools are adjusted automatically through electrical impulses from the gages.

Either machine can be shut down for changing tools, while the other continues to operate. This is made possible by the use of two storage distribution units. Each unit is capable of storing many parts and releasing them as required by the following machine. Even though these units may store hundreds of parts, a single part going into an empty unit would be delivered immediately to the following machine.

For more data circle 115 on Reader Service Card



Automation line consists of Ex-Cell-O Cam Operated Precision Boring Machines

Univer  
Angle

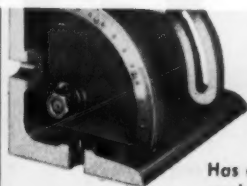
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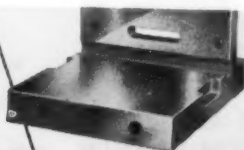
For ever  
toolroom





### Toolmaker's Adjustable Knee

Has almost 1001 uses for mounting small work during inspection, layout and machining. Low price, extreme accuracy: sides and face square to within .0001". Angular setting to within 5 minutes by Vernier Scale, 30 seconds by use of built-in sine studs.

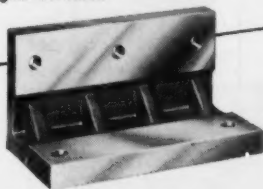


### Multiplex Angle Irons

Save time by permitting a single setup of workpiece for many machining and inspection operations. All working surfaces scraped square within .0005" in 6", parallel within .0005".

### Universal Right Angle Iron

Finish ground on all working surfaces, sides and ends ground square and parallel to within .0002". Can be set on any side or end. Four sizes: 5" to 16" on largest surface.

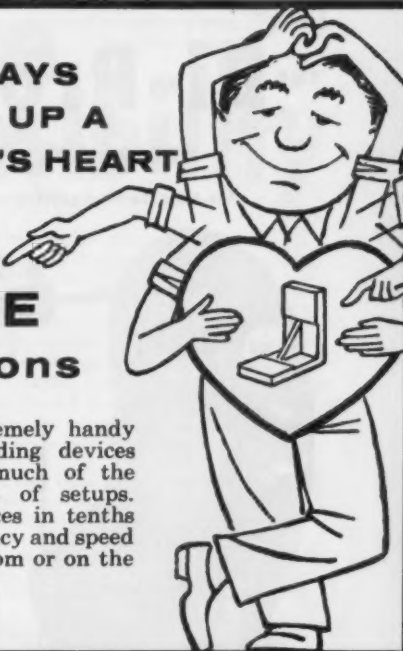


### Duplex Angle Irons

Finished inner pads increase accuracy, speed setup work on planers, boring mills, shapers and drill presses. Inner pads parallel to sides within .0005". Outer faces square within .0005" in 6".

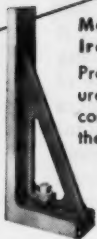
## 6 WAYS TO SET UP A MACHINIST'S HEART ... WITH TAFT- PEIRCE Angle Irons

Here is an extremely handy line of workholding devices that can take much of the "trickiness" out of setups. You get tolerances in tenths to increase accuracy and speed — in the tool room or on the production line.



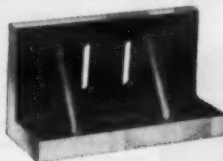
### Measuring Irons

Provide a fixed surface for measurements. Narrow width makes it convenient for clamping work on the machine table. Front face and bottom finished square within .0002" per foot.



### Slotted Angle Irons

Eight different sizes to give variety of combinations of height and width to handle diversity of work. Working faces ground square to within .0005" in 6". Special sizes and hand scraped surfaces on request.



Stock the complete line.

Send for listing of all models with prices.

For everything in precision  
toolroom specialties

## TAKE IT TO TAFT-PEIRCE

TAFT-PEIRCE MANUFACTURING COMPANY  
WOONSOCKET, RHODE ISLAND



MADE  
IN  
U.S.A.

## new shop equipment . . .

**LONG TANG  
CONSTRUCTION WRENCH**

The Billings and Spencer Co., Hartford 1, Conn., has announced the addition of a long tang, 15 degree angle, Vitalloy forged construction wrench to its present line. Emphasis is placed on the long tang for aligning work on the



Billings and Spencer Long Tang Wrench

job. Correct proportion of the tang to the handle gives ample leverage and quick insertion into bolt holes.

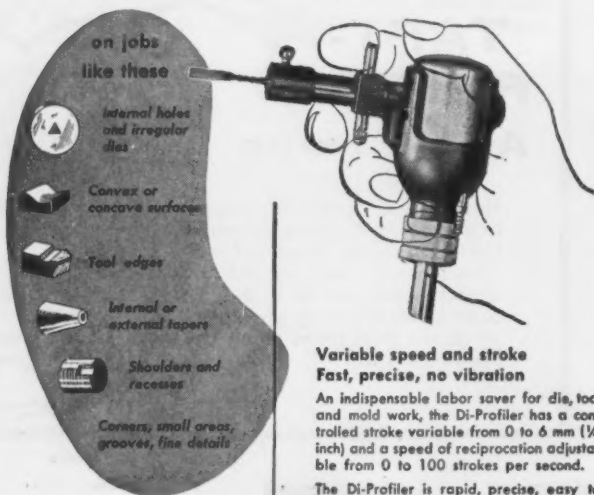
Openings are deep throated, accurately milled or broached, and uniform

to size. This line is drop forged from special analysis alloy steel, heat treated to develop the utmost in physical properties. The wrench has a heavy chrome plated finish over copper and nickel with a range of openings from  $\frac{1}{8}$  inch to 2 inches.

For more data circle 116 on Reader Service Card

**THE Di-Profiler****RECIPROCATING HAND MACHINE**

for time-saving cutting—roughing—finishing



Write for  
free demonstration  
or illustrated  
price list  
DS-117

Tools for  
every type  
of work

CUTTERS, FILES,  
DISCS, POINTS,  
BURRS, LAPS,  
SCRAPERS

**Variable speed and stroke  
Fast, precise, no vibration**

An indispensable labor saver for die, tool and mold work, the Di-Profiler has a controlled stroke variable from 0 to 6 mm ( $\frac{1}{4}$  inch) and a speed of reciprocation adjustable from 0 to 100 strokes per second.

The Di-Profiler is rapid, precise, easy to operate—simple and sturdy in construction. Its weight of less than one pound and freedom from vibration eliminate fatigue and assure perfect control for the most intricate work.

Moderately priced, the Di-Profiler pays for itself many times through time-saving cost reductions.

**ENGIS EQUIPMENT COMPANY**

Sole Authorized Distributor for the United States  
431 S. Dearborn Street, Chicago 5, Illinois

VISIT SPACE 1644 METAL SHOW

For more data circle 530 on Reader Service Card

★ ★ ★

**COMBINATION  
DRILL AND  
REAMER**

Chicago - Latrobe, 419 West Ontario St., Chicago 10, Ill., has announced that it is now producing a complete line of drills and reamers made to customers' prints, such as the combined drill and reamer shown in the accompanying illustration on the following page. This

For everything in precision  
toolroom specialties

TAFT-PEIRCE MANUFACTURING COMPANY  
WOONSOCKET, RHODE ISLAND

MEANS  
YOUR

**YOU GET more\* WHEN  
YOU BUY BEARINGS FROM YOUR**

**Bunting®  
DISTRIBUTOR**



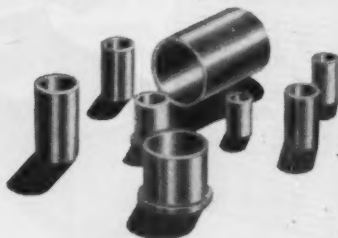
**\*  
more  
responsibility**

NEVER WRITTEN IN ANY SPECIFICATIONS, the responsibility of the supplier is established only by his record of service. It is well known that Bunting goes far beyond the strict terms of a transaction to meet all the requirements of the customer, even in crises produced by unforeseen and unavoidable complications. Complete manufacturing facilities, an unfailing supply of Bunting Cast Bronze and Bunting Sintered Powdered Oil-filled Bronze Stock Bearings and Bars assure that Bunting distributors always have ample stocks.

Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars—Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.



Sensible price brackets  
making ordering and pricing easy—  
an exclusive Bunting feature.



**Bunting** **BUSHINGS, BEARINGS,  
BARS AND SPECIAL PARTS  
OF CAST BRONZE AND  
POWDERED METAL.**

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities  
For more data circle 531 on Reader Service Card

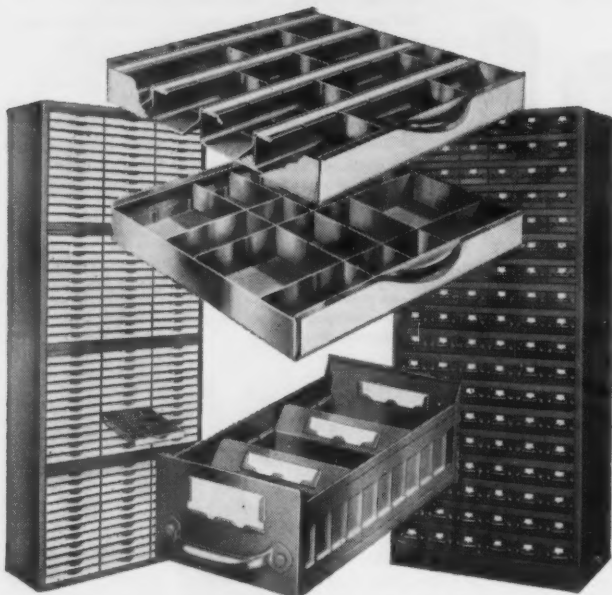
## new shop equipment . . .

**Chicago-Latrobe Combined Drill and Reamer**

particular combination drill and reamer makes a piloted hole to be reamed in one operation.

For more data circle 117 on Reader Service Card

**up to 6,184 Drawer Compartments  
in only 3 sq. ft. of floor space!**



**Equipto**

606 Prairie Avenue  
Aurora, Illinois

Write for free catalog No. 202

For more data circle 532 on Reader Service Card

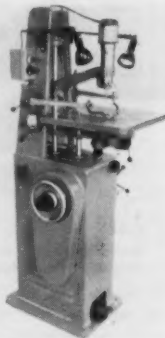
**TOOL MAKING MACHINE**

The Connecticut Tool and Engineering Co., Round Hill Rd., Fairfield, Conn., has announced the Williams Model F4 Roto Recipro Tool Making Machine.

This machine affords a unique method whereby rotary and reciprocating motions are obtained simultaneously; otherwise known as Roto Recipro Machining. Through this method, the machining of all types of tool

steels, contoured tungsten carbide and hardened steels are obtained efficiently and economically. To accomplish this, inexpensive diamond tools, carbide files, grinding points and carbide burrs are utilized. An interchangeable file bracket provides conventional tension and compression filing, as well as sawing and honing.

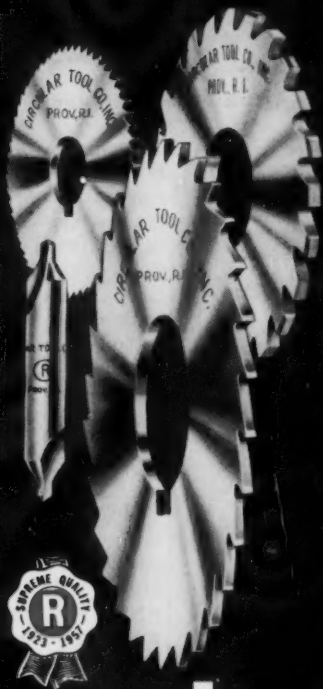
For more data circle 118 on Reader Service Card



**Williams Roto Recipro  
Tool Making Machine**

For metal-cutting specialties

consult these  
**CIRCLE R**  
specialists



**BURBANK**

Production Machinery  
Sales Inc.

**CHICAGO**

Donald Robertson & Co.

**CLEVELAND**

Production Tool Co.

**DAYTON**

J. R. Kuntz Company

**DETROIT**

A. D. Spruce

**HACKENSACK**

The Eaton Company

**INDIANAPOLIS**

Walter F. Greene &  
Associates

**KANSAS CITY**

B. C. MacDonald & Co.

**MILWAUKEE**

Ford Tool Co.

**MONTREAL**

Humphrey B. Walton

**NEW YORK CITY**

J. B. Cremonia (Export)

**PHILADELPHIA**

General Tool Sales Co.

**PHOENIX**

DiEugenio Tool Center

**PITTSBURGH**

Ralph Esposito & Co.

**PROVIDENCE**

Fred J. McMillan

**ROCHESTER**

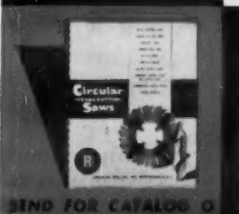
James O. Horne

**ST. LOUIS**

B. C. MacDonald & Co.

**WESTBURY, L. I.**

The Eaton Company



We develop special tools to implement automatic production — and we offer the services of these Circle R Specialists to advise on the design of special circular cutting elements. Call them in as consultants to assure better production and to control costs.



**CIRCULAR TOOL CO., INC.**

PROVIDENCE 5, RHODE ISLAND

*Specialists in Circular Cutting Tools Since 1923*

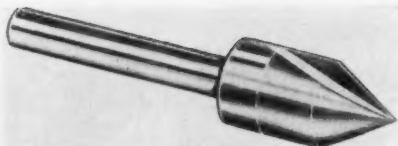
METAL SLITTING SAWS  
COPPER SLITTING SAWS  
SCREW SLITTING SAWS  
COMMUTATOR SLITTING SAWS  
JEWELERS SLITTING SAWS  
CUT OFF SAWS • CIRCULAR  
KNIVES & ROTARY SHEAR  
BLADES • CIRCOLOY STEEL  
SAWS • SOLID & TIPPED  
TUNGSTEN CARBIDE SAWS  
COMBINED DRILLS & COUNT-  
ERSINKS • CENTER REAMERS

For more data circle 533 on Reader Service Card

## new shop equipment . . .

## CARBIDE CUTTING TOOLS

Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., is now offering three carbide cutting tools. A chatterless single flute solid carbide countersink, CS, is now available in  $\frac{3}{8}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  inch diameters, all  $\frac{1}{4}$  inch shank with 82 degree taper (standard

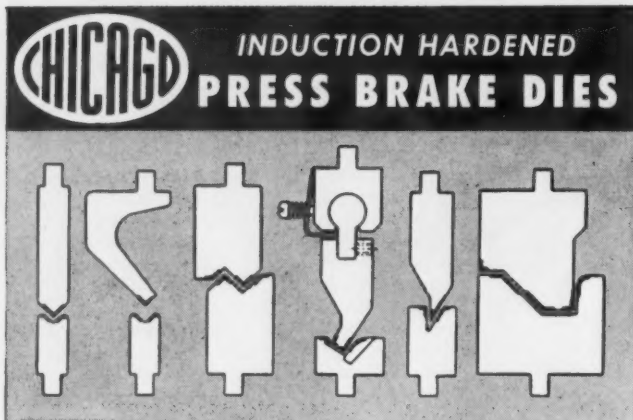


Super Single Flute Carbide Countersink

60 degree taper is also available to order). Single flute solid carbide center laps, CL, in the same sizes as the

countersinks, are offered with a 60 degree taper. A line of chucking reamers is being introduced in decimal, RCB, and fractional, RCS, sizes from  $\frac{1}{4}$  to  $\frac{3}{4}$  inch. The cost is considerably less than all solid carbide construction due to a solid carbide flute section only, the shanks being made of steel.

For more data circle 119 on Reader Service Card



Heavy lines indicate hardened surfaces

for greater die life —

at no extra cost —

on any make press brake

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO induction-hardened dies for your next press brake job.

Steel Bending Brakes For Over Fifty Years

4901

**DREIS & KROMP**  
MANUFACTURING COMPANY

7418 S. Loomis Blvd., Chicago 36, Illinois

**CHICAGO**  
STEEL BENDING BRACKES  
BOX AND PAN BRACKES  
PRESS BRACKES

For more data circle 534 on Reader Service Card

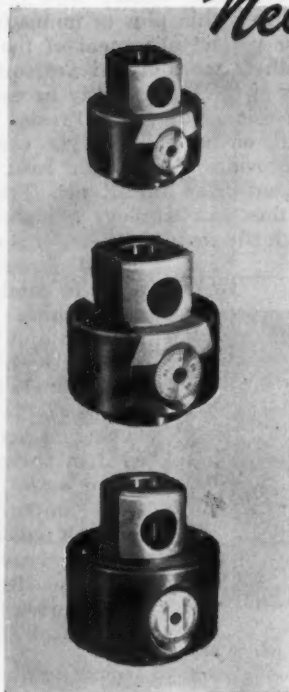
★ ★ ★

### TRIPLE PUNCH PRESS

A triple punch press has been designed by Kenco Manufacturing Co., 5211 Telegraph Rd., Los Angeles 22, Calif., for exceptionally long progressive die work; also for punching, forming and blanking where extremely



# New from Criterion!



## 3 NEW BORING HEADS WITH THESE OUTSTANDING FEATURES

Round-body design  
Cross-hole for greater range  
Short - compact construction  
Sizes — #102 has 2" diameter  
          #103 has 3" diameter  
Boring range — 1/16" to 8" and larger

## NEW 3" DIAMETER MODEL #203 INCLUDES THESE ADDITIONAL FEATURES

Protective cap houses all moving parts  
Friction lock dial face permits return  
to zero setting.

## THESE NEW HEADS TAKE 1/2" or 3/4" SHANK BORING TOOLS AND BORING BARS

## RUST-RESISTING BLACK AND SATIN-CHROME FINISH

Offset range — 1/2" in 2" dia. model  
                  3/4" in 3" dia. model  
Complete line of high-speed and carbide  
boring tools to fit all Criterion Heads  
carried in stock.



CRITERION BORING HEADS are better because they  
combine utility with simplicity of design — see  
sketch to the right for one of many features.



Consult your Criterion Dealer or write for free literature.

For more data circle 535 on Reader Service Card

### new shop equipment . . .

long die sets are used. This equipment will also do press brake work quickly.

The unit consists of three 5 ton punch presses mounted on a rugged frame. Crankshaft and rams operate synchronously. The drive engages the crankshaft at a central point, eliminating differences in torsional twist.

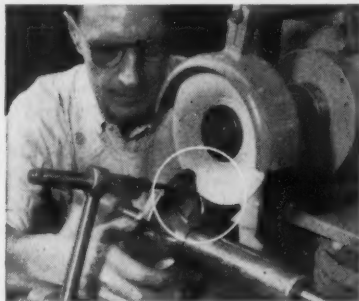
There are three bolster beds planed parallel to within plus or minus 0.002 inch for perfect alignment of the die set. Both frame and bed are sorbitic castings of the high rigidity necessary for precision punching. Presses are mounted on a ribbed style casting which provides a firm, rigid base.

Designated as the Kenco Triplex Press, this unit employs a high torque, high slip motor. The motor is connected direct in

order to eliminate a clutching mechanism and permit a central drive. Single tripping is obtained by a cam actuated limit switch, which starts and stops the motor for each punching cycle. A brake in the motor stops it instantaneously at the finish of a cycle.

The motor is always "dead" during the loading cycle, hence hand feeding in the die area is completely safe against double tripping. As a further precaution against double tripping, the palm buttons initiating a trip are widely spaced to keep the operator's hands clear of the danger zone. Both buttons must be pushed to start a cycle, and held until the stroke

## Precision-built for every tool room job



Norton makes wheels for every tool room grinding job — and precision-processes them for precise duplication and the same money-saving "Touch of Gold" performance every time you re-order.

For *Sharpening Steel Tools* and for surface, cylindrical and internal grinding on all steels, Norton G Bond wheels—in 32 ALUNDUM\* abrasive, 38 ALUNDUM abrasive or 19 ALUNDUM abrasive—have no equal.

For *Carbide Grinding*, Norton diamond wheels are the "Crown Jewels." In resinoid bonds for wet or dry grinding. For carbide grinding K Bond CRYSTOLON wheels are also economical.

For *Cutting-Off*, Norton makes wheels, for all wet and dry tool room applications.

See *Your Norton Distributor* for aid in wheel selection and helpful booklets. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1734



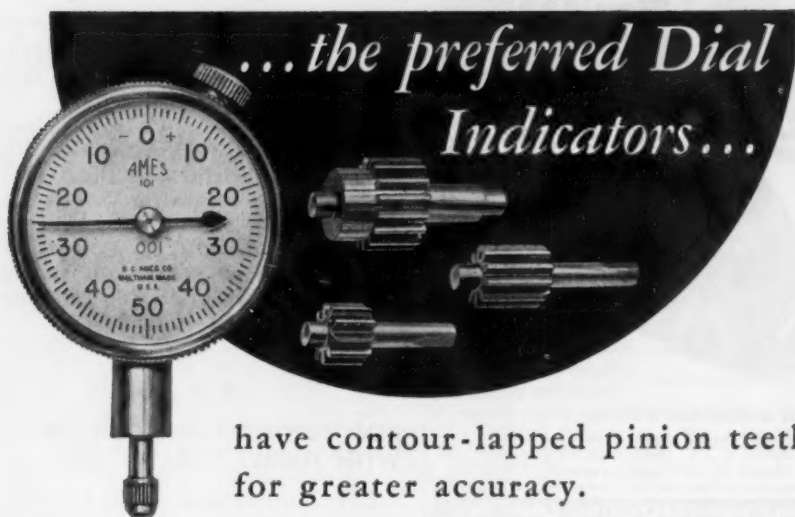
*Making better products...  
to make your products better*

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories  
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

\*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

For more data circle 536 on Reader Service Card

# AMES



*...the preferred Dial Indicators...*

have contour-lapped pinion teeth  
for greater accuracy.

Because tooth form determines how well pinions mesh — Ames hardens, contour laps, and carefully inspects pinions for perfect tooth form and finish. The result: Pinions that mesh perfectly and a complete absence of "play". This extra attention to detail is typical of the Ames manufacturing approach. It helps explain why so many companies specify Ames Dial Indicators as "preferred". Write today for complete information.

*Representatives in principal cities*



## B.C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

For more data circle 537 on Reader Service Card

## new shop equipment . . .

reaches bottom. It is mandatory for the operator to release both palm buttons before starting a new cycle.

Versatile control is provided by a selector switch which sets the press for various types of operation, including single trip, continuous operation and

### Extra Capacity with **hall COLLET CHUCKS**

for  
**SPEED,  
ACCURACY,  
ECONOMY**



**Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over.**

**Tremendous grip over or under stock size.**

**Without adjustments. Shortest overhang. All grip ...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.**

**SATISFACTION GUARANTEED!**

**Made in Three Sizes to Fit Your Requirements:**

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

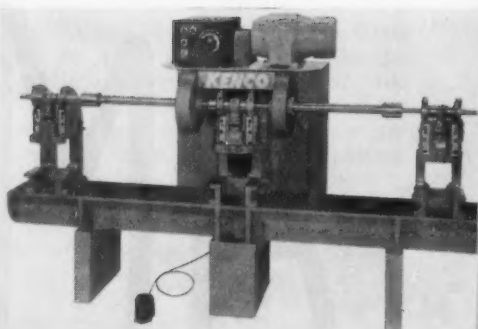
Model C...3" (max. capacity 3 3/4")

Write today for illustrated catalog and price list—Dept. MM-11.

**HALL MANUFACTURING COMPANY**

622 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

For more data circle 538 on Reader Service Card



**Kenco Press for long progressive die work**

inching. Timing can be changed in a matter of seconds.

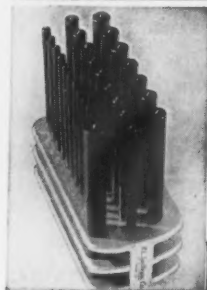
The presses sit on 42 inch centers, allowing a total die area of 8 by 102 inches. Shut height with standard 1 inch stroke to the bolster bed is 5 7/8 inches. Center line of ram holes to back is 3 3/4 inches. Diameter of the ram hole is 1-9/16 inches; ram clamps are 8 inches wide with slotted holes for bolting them to the die plates.

For more data circle 120 on Reader Service Card

★ ★ ★

### **POSITIONING TABLE FOR USE WITH TURRET DRILL**

Burg Tool Manufacturing Co., Inc., 15001 South Figueroa St., Gardena, Calif., has announced a completely au-



### **SPELLMACO 'SPOTTERS'**

**A matched set of transfer punches for toolmakers, machinists and tool cribs**  
**Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.**

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

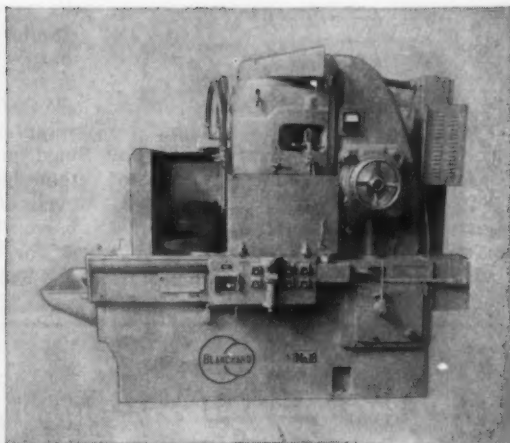
SET #3-17; 28 punches with indexed stand—sizes 3/32" to 1/2", by 1/4"—plus handy 1 1/32" size. Length 4 7/8". ONLY \$17.90.

Single sizes available

**R. L. SPELLMAN CO. • URBANA, OHIO**

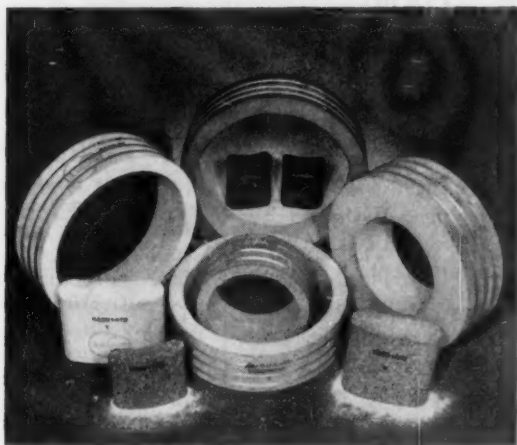
For more data circle 539 on Reader Service Card

*For best results  
from your  
Blanchard  
Surface Grinder*



BLANCHARD NO. 18 SURFACE GRINDER

*Use Blanchard Wheels!*



Blanchard specializes in the manufacture of segments and cylinder wheels for Blanchard and other Vertical Spindle Surface Grinders. If you have a difficult grinding job, whatever the material may be, or if you are not satisfied with the results you are now getting, let us help you.

Blanchard wheels are the quality wheels for Blanchard Grinding. Use them to get maximum performance from your Blanchard!

**PUT IT ON THE**



*Please send me a free copy of "The Art of Blanchard Surface Grinding" (3rd Edition).*

**THE BLANCHARD MACHINE COMPANY**

64 STATE STREET, CAMBRIDGE 39, MASSACHUSETTS

For more data circle 540 on Reader Service Card

## new shop equipment . . .


tomatic tape controlled table for use as an accessory to the Burgmaster Multiple Spindle Turret Drill. The flexibility of the standard Burgmaster Drill, coupled with the numerically controlled positioning table, provides an unusual facility both in prototype and production operation. Each spin-

dle is controlled individually by the standard Burgmaster in speed, feed and precision depth control, rapid approach and return. Selection of the six (Model 2BH) or eight (Model 3BH) spindles and table position is programmed on the tape. The unattended system then operates through a complex cycle of drilling, tapping, reaming and boring both accurately and quickly.

The Burgmaster Two Axis Positioning Table is made up of the following

reliable elements: tape reader and command unit; comparison unit; servo control and table drive unit; digitizer; display; and the positioning table. The control contains the following important features: positive position measurement of machine position instead of counting. Display of machine position is in direct reading decimal form to 0.001 inch. The tape is prepared by punching of Mylar tape. Decimal information from a blueprint or table of dimensions is perforated in the tape, as well as sequence control of the six or eight spindles.

Positioning of the table in each axis is accomplished with a servo motor, the speed of which is controlled by



# HOLD IT!

**FIRMLY  
BUT GENTLY**

**WITH  
WOODWORTH CHUCKING EQUIPMENT**

Our tough looking character who is holding the little bird clearly demonstrates one fact: whenever you are holding *anything* it should be secured with gentle firmness. And this is so true when considering chucking equipment.

Your best machine will produce only as accurately as its work-holding device permits and Woodworth manufactures the most rugged, accurate and dependable chucks for precision machining in America.

We invite your inspection and consideration of N. A. Woodworth products. There is a Woodworth Sales Representative in your area and a letter to the N. A. Woodworth Company will place him promptly at your service.

## WOODWORTH

1300 EAST NINE MILE ROAD  
DETROIT 20, MICHIGAN

For more data circle 541 on Reader Service Card



# sure / bore

## "Package Plan"

*offers...*

★ CONVENIENCE

★ EFFICIENCY

★ ECONOMY



### NEW PACKAGE PLAN INCLUDES:

**Boring Bar "4-some Package"...**

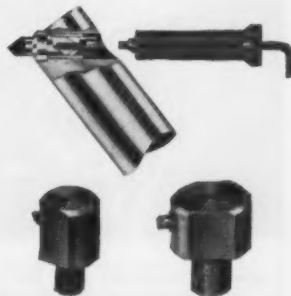
4 Boring Bars from 7/8" to 1-3/4" dia., with Micrometer adjustment. Tool Bit mounted at 53° or 90° angle. Boring range from 1" to 3-1/8" dia.

**Sure-Bore Cartridge "Package"...**

"53" or "90" pack includes 3 complete assemblies, cartridges, carbide tool bits, wrenches.

**Boring Head "2-some Package"...**

includes a 2" and 3" head, 2 long and 2 short tool bits... Boring range 2-3/4" to 5-1/4" dia.



WRITE FOR LITERATURE AND PRICES



## PORTAGE Double-Quick, Inc.

1041 SWEITZER AVENUE • AKRON 11, OHIO

For more data circle 542 on Reader Service Card

## new shop equipment . . .

the positional error at each particular instant.

Flexibility has been designed into the system for future additions such as drill depth control, so that the same drill size may be used to produce holes of varying depths.

The tape command unit comprises a sprocket drive which can be advanc-

ed manually or automatically as one drilling sequence is completed. Each advance brings a new set of information in the form of decimally punched Mylar tape under the tape reader. The reader utilizes micro switches, rather than finger contacts, so that dirt and oil cannot affect the readings in any way.

This is important for use in machine shop work. Moreover, no intermediate relay circuitry is necessary. The out-

puts of the tape reader and the digitizer, which is mechanically attached to the table, are subtracted in the comparison unit and an analog voltage, proportionate to the difference error, is generated. This is accomplished electronically, rather than by relays, so that instantaneous comparison and error calculation can be effected.

The error voltage from the comparison unit is utilized by the servo control unit to govern the speed of the drive motor so that little or no overshoot occurs.

The digitizer is a numerical reading transducer which measures to 0.001 inch, a total range of five decimal places. This measurement is direct,

# Air-Cooled Lighting by Dazor at Low Cost



Choice of  
Arm Extensions:  
31" (No. 1100)  
20" (No. 1101)  
Same Price

## Adjustable-Arm Models



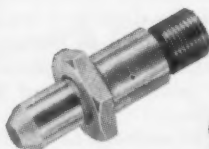
Light up machines and benches at rock-bottom cost and get Dazor dependability besides. New Adjustable-Arm Lamps mount solidly, hold fast in any position set. Either top- or side-mounted reflector. Air-cooled housing is safe to handle despite continuous use. Gray baked enamel over bonderizing. Call your Dazor distributor. Dazor Manufacturing Corp., St. Louis 10, Missouri.

... Makers of

# DAZOR FLOATING LAMPS

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ALIGNMENT  
USE  
UNIVERSAL  
LOCATING  
PINS**



Threaded Pin



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Hardened and ground to close tolerances, precision-made Universal Locating Pins insure quick, accurate alignment, through even the longest, toughest production runs. And their cost is substantially less than ordinary tool-room pins. Stocked in all standard sizes for immediate delivery . . . in round or relieved, press-fit, threaded or lock screw types. Write today for 98-page catalog describing the complete line of Universal quality products.

203

**UNIVERSAL ENGINEERING COMPANY • FRANKENMUTH 9, MICHIGAN**

For more data circle 544 on Reader Service Card

## new shop equipment . . .

rather than employing any counting principle, and is consequently independent of the past or future movements of the digitizer.

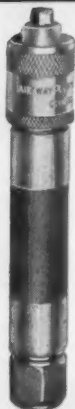
At all times a vertically reading neon display panel indicates the spindle in operation and the exact position

## SAVE AIR COSTS & MAINTENANCE



with Air-O-Check, the Leak-Proof Air Gun. Hundreds of thousands in use in factories, machine shops and foundries . . . wherever air is blown.

Expert design of internal fulcrumed lever insures leakproof, dependable, care-free service.

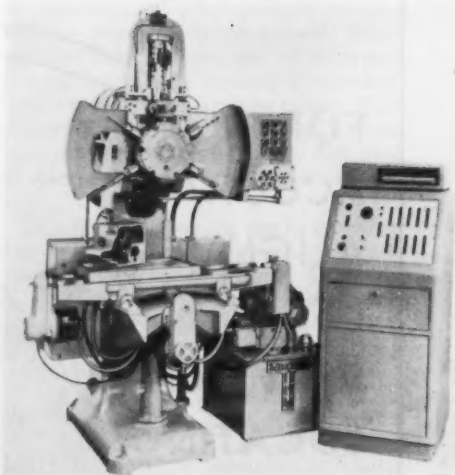


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Model A literature and prices. Model FA

### AIR-WAY PUMP & EQUIPMENT CO.

1046 N. Kilbourn Ave., Chicago 51, Ill.

For more data circle 545 on Reader Service Card



**Burgmaster Two Axis Positioning Table applied to multiple spindle turret drill**

of the table. This display is controlled by the output of the digitizers, which are mechanically coupled to the positioning table and, therefore, indicates the actual table position and not the commanded position.

For more data circle 121 on Reader Service Card

★ ★ ★

## BUILDING BLOCK UNIT

The endless versatile variations of catalog components, as produced by



IN 11 SIZES—No. 6 to 1"  
N.C. in all S.A.E. sizes.



*You Need an Extra Hand Now  
to Speed Up Production!*

### HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

**HEIMANN MFG., CO. • URBANA, OHIO**

For more data circle 546 on Reader Service Card



\*Nicholas Crane and his legend of Sleepy Hollow, originators of the throw-away head!



## T-J Reamers

have throw-away heads, too!

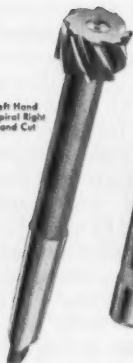
### New Exclusive Design Cuts Replacement Costs More Than Half!

Exclusive in design... the New-type T-J Reamers cut your replacement costs *more than half!* Only the quickly installed *head* to replace, after buying original shank. Wide range of interchangeable heads from  $\frac{1}{8}$ " to  $2\frac{3}{4}$ " inclusive, in  $1/16$ " increments are available with right or left hand spiral flutes for thru or blind hole reaming.

Tapered hole in head insures con-

centricity and *new* thread design assures a snug fit on smoothly ground tapered shank. Reamer operates free from binding or sticking due to cutting portion wearing undersize and creating negative relief. Backed by T-J's 40 years of know-how as one of the largest manufacturers of die sinking milling cutters. Write to Tomkins-Johnson Co., 617 North Mechanic Street, Jackson, Michigan for T-J Catalog #153-1.

Left Hand  
Spiral Right  
Hand Cut



Right Hand  
Spiral Right  
Hand Cut



**TOMKINS-JOHNSON CO., Jackson, Mich.**

For more data circle 547 on Reader Service Card



**TOMKINS-JOHNSON**

RENTAL, JOB AND WAREHOUSE DEPARTMENTS, LANSING, MICHIGAN

**new shop equipment . . .**

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, is exemplified by the accompanying illustration shown on Page 288.

Typical of the building block program, an available basic machine can be converted into a modern high production machine, or a special purpose

installation. Usually, this represents the simple and proper selection of a work head, a motorized spindle for grinding, milling, boring and so on, along with a suitable slide or feed.

The unit illustrated represented a conversion on an existing steel mill roll grinder. The operation involved grinding of the 6 to 14 inch diameter journal on a roll 3 to 4 feet in diameter by 12 to 14 feet long. The basic

machine incorporated a swivel for positioning of the illustrated assembly at the proper angle for also accurately grinding the taper on the journal.

The simple approach consisted of detailing the problem; the need for a  $7\frac{1}{2}$  h.p., 1,800 r.p.m., super precision motorized spindle with taper nose to accommodate a balancing type of wheel holder for the 20 inch diameter resinoid bond wheel; the need for a structural plate steel wheel guard to protect the grinding wheel; a cross feed for positioning and also to compensate for wheel wear; and a hydraulically controlled air cylinder assembled on the feed with non-metallic ways for traversing the grinding wheel

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IN DECIMAL SIZES!**

**Schmarje**

**CARBIDE STUB SCREW  
MACHINE**

**REAMERS**



**FAST  
DELIVERIES OF  
THE EXACT SIZE YOU WANT!**

Better finish . . . greater accuracy  
. . . lower tool cost! *Write*  
*today for specifications and prices.*

**SCHMARJE TOOL COMPANY**

Carbide Reamers • Form Tools  
MUSCATINE 3, IOWA

For more data circle 548 on Reader Service Card





# "Liquid Honing\* pays for itself 5 times faster than it depreciates!"

says Clarence H. Stowe,  
president of a Milwaukee  
tool and die shop



Dollar for dollar,  
job for job, no other surface  
conditioning method can  
equal Liquid Honing.

"Our Liquid Honing machine," Mr. Stowe continues, "enables us to remove heat-treat scale instead of waiting for the heat treater to do it. Consequently, customers get faster job deliveries.

"In only one-fourth usual time, Liquid Honing cleans molds for repairs or remodeling — and ends what used to be a difficult, tedious hand operation.

"Many die casting and plastic molds now go out with an oil-retaining Liquid Honed satin finish that eliminates hand polishing after final heat treating.

"In addition, we clean hand tools, spare machine parts, cutting tools, electrical contacts — anything small enough to go into our machine. So it's easy to understand why Liquid Honing will pay for itself within a year — *five times faster than it depreciates!*"

That's the Stowe story—a "preview" of a few of many advantages Liquid Honing can bring to your tool room, machine shop or die department. You'll be surprised at the low cost — only \$550 to \$1500 for a standard machine.

Write for details or send a sample part  
for free demonstration processing.

\*Vapor Blast and  
Liquid Honing  
are trademarks.

**VAPOR BLAST MFG. CO. 3013 W. Atkinson Ave.**

**Milwaukee 9, Wis.**

For more data circle 549 on Reader Service Card



November, 1957

modern machine shop 287

# QUALITY AT LOW COST

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- Bench
- Pedestal

QUEEN CITY Heavy Duty Disc Grinders and Buffers save you money when you buy and during every hour of use. Ruggedly designed, they feature special heavy duty bearings and motors. So good they're offered on a 30-day trial, yet priced 20 to 30% under competing makes.

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**QUEEN CITY  
MACHINE TOOL CO.**

3911 Kellogg Ave., Cincinnati 26, Ohio

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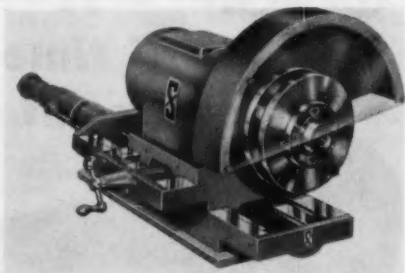
**QUEEN CITY  
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"High Quality—Low Cost—For Over 50 Years"

For more data circle 550 on Reader Service Card

288 modern machine shop

new shop equipment . . .



Standard Electrical Building Block Unit

the entire length of the journal.

The manufacturer claims that this is truly a building block unit, each a catalog item; namely, a motorized spindle, wheel holder with balancing weights, wheel guard, compound feed consisting of a 10 inch cross slide and 20 inch longitudinal traverse with a commercial power cylinder.

For more data circle 122 on Reader Service Card

★ ★ ★

## WHEEL DRESSER FOR CYLINDRICAL GRINDING MACHINES

A hydraulic contour wheel dresser, known as the Model 86, is available from Hoglund Engineering and Man-

Quick  
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**TAPER  
ATTACHMENTS**

For All Lathes—Old or New—  
9" to 36" Swing

Write for Bulletin

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\$29.50  
to  
\$149.50

For more data circle 551 on Reader Service Card

November, 1957

*Now* **A COMPLETE LINE**  
of the Revolutionary New  
**Webber OPTICAL**  
**HEIGHT GAGES**  
25" - 37" - 49" - 61"

Combining two proven principles of precision measurement — WEBBER Gage Blocks and the Leitz Measuring Microscope —

THE WEBBER OPTICAL HEIGHT GAGE has made it possible, for the first time, to make measurements in millionths, up to a full 61" of height. Its fantastic accuracy is maintained throughout the entire length of the instrument,  $\pm .000005$ " per inch of length.

Simple to use, fast, accurate, the WEBBER Optical Height Gage introduces a new era of manufacturing accuracy. The saving of time, the accelerated rate of production, and the resultant increased profits make it vitally important that every manufacturer who is conscious of today's trend toward even greater precision get the facts about this revolutionary new measuring instrument.

Your inquiry is invited.

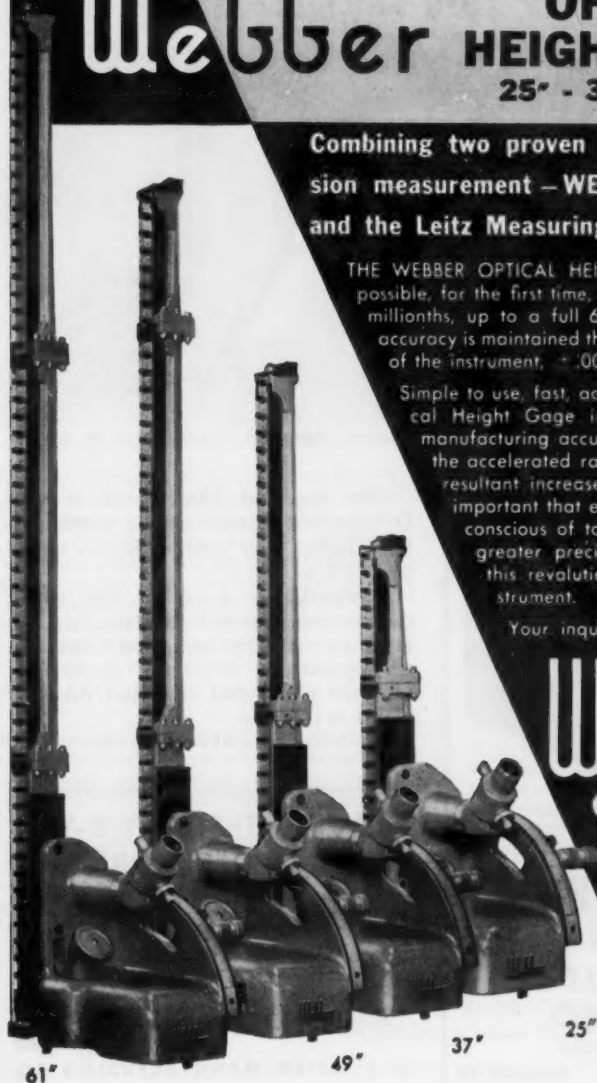
**Webber**  
GAGE CO.

12899

TRISKETT RD.

CLEVELAND 11,

OHIO



For more data circle 552 on Reader Service Card

November, 1957

modern machine shop 289

## new shop equipment . . .

ufacturing Co., Inc., 343 Snyder Ave., Berkeley Heights, N. J., for use on cylindrical grinders.

The dressing diamonds are optically set in the microscope fixture so that no dresser adjustments are necessary when diamonds are being changed.

**1 Minute**  
to locate an edge within .0005"!



**JUMP EDGE FINDER**  
PRICE \$2.50 Complete satisfaction — or full refund.  
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**ELISHA PENNIMAN** ELMWOOD 10, CONN.

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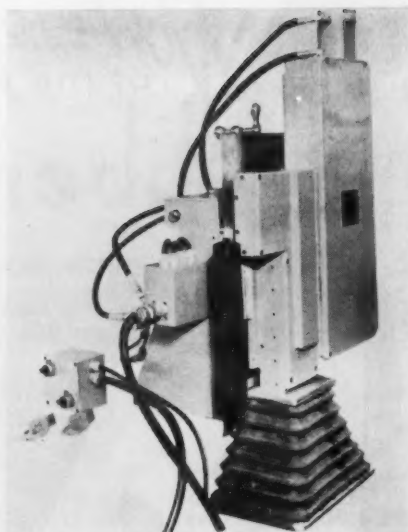
**AUTOM**



**CONTINUOUS HINGES**  
Manufactured by  
**AUTO MOULDING & MFG. CO.**  
WRITE FOR CATALOG  
1114 E. 87TH ST. CHICAGO 19

For more data circle 554 on Reader Service Card

290 modern machine shop



Hoglund Model 86 Wheel Dresser on grinder

The Hoglund Model 86 Wheel Dresser will handle profile widths up to 6 inches and profile depths up to 3½ inches.

Hydraulically operated, this wheel dresser may be tied directly into the grinding cycle for completely automatic operation. Wherever applicable, uniform peripheral diamond dressing speed is possible.

For more data circle 123 on Reader Service Card

## REICH — THE ONLY 3-WAY PRECISION TEST INDICATOR

Accurate and repeated reading in either direction. No mirror needed to read both sides or top. Non rust, non magnetic movement. .014" reading.

Price \$9.00

Write for folder



**J. R. REICH MANUFACTURING CO.**  
201 E. Stroop Road Dayton 9, Ohio

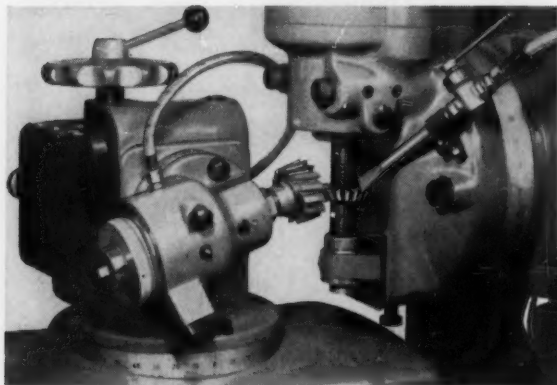
For more data circle 555 on Reader Service Card

November, 1957

# Automatic Indexing For Milling

## All Types of Cutting Tools

with a **REISHAUER FA** Milling Machine



A Reishauer FA machine milling teeth on a shell end mill

Now, Reishauer's new FA Milling Machine provides you with an **automatic indexing attachment**—permitting higher production rates on a wide variety of tools—such as milling cutters, reamers, countersinks, index plates and others. Universally adjustable, this Swiss made machine can produce (1) teeth on end or circumferential surfaces, or (2) straight or helical flutes on cylindrical or tapered workpieces. It is ideal for workpieces that require dividing operations. As index plates Reishauer uses its own, world-famous ground gears—guaranteeing extreme indexing accuracy.

All movements on the Reishauer FA—longitudinal slide, rapid adjustment device, cross-slide clamping and indexing—are electro-hydraulically operated. By means of the automatic indexing device, all working operations, return strokes and dividing movements follow each other in pre-determined sequence and increments, until the workpiece has made a complete rotation. Complete coordination and interlocking of all movements prevents any possible working errors. Index plates for irregular divisions are also available.



The Reishauer FA Milling Machine

### SPECIFICATIONS

Workpiece Diameters .....	1/2" to 6 1/4"
Milling Cutter Diameters .....	1 3/8" to 4 1/4"
Milling Spindle Speeds .....	63—400 rpm
Maximum Clamping Length .....	9"
Stroke of Longitudinal Slide .....	15"
Milling Spindle Adjustment from vertical axis .....	±30°
Horizontal Workpiece Adjustment .....	to 90°
Vertical Workpiece Adjustment .....	±45°
Possible Indexings .....	3—36

Write For Additional Information

# COSA

—nationwide sales and service of precision machine tools—  
—from bench lathes to boring mills.

**COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.**  
IN CANADA contact **COSA CORPORATION OF CANADA, LTD., 1160 Lakeshore Rd., Long Branch, Toronto 14, Ont.**  
For more data circle 556 on Reader Service Card

## new shop equipment . . .

**DUST COLLECTOR HAS  
EXTRA STORAGE CAPACITY**

A special, extra storage capacity dust collector, known as the Model 520-D, is the latest addition to the Dustkop line manufactured by Agat

**The Barrett Vresser**



- SIMPLE
- ACCURATE
- POSITIVE LOCKING
- EASY TO OPERATE

... For accurate angles on grinding wheels.



**MUTUAL MACHINE CO., Inc.**  
8 Loring St., Hudson, Mass.

For more data circle 557 on Reader Service Card



Agat Dustkop Model 520-D Dust Collector

Manufacturing Co., 1398 Church St., Adrian, Mich. Ten inches higher than the standard Model 520, it has identical air handling characteristics and base dimensions, but has a dust storage bin that is over twice as large. The manufacturer recommends it for use in metalworking shops or in any other shop operation where dust volume is unusually large. Even where the problem is ordinary, the increased capacity of the Model 520-D Dust Collector will cut in half the need for emptying. The base is 18 by 23 inches and the height is 34 inches.

For more data circle 124 on Reader Service Card

**Heavy Duty Bench Type ALLEN Punch Presses**

**POWERFUL • DEPENDABLE  
ECONOMICAL  
Fully Guaranteed  
164 Different  
Model Combinations  
1 to 5 ton capacities**

See your Supply Dealer or write for Catalog giving complete information, specifications and prices.



Model B-5  
5 Ton  
\$189.50  
less motor  
job



Model B-2 — 2 Ton  
\$87.50 — less motor job



Model LTX — Special Duty  
1 Ton — \$89.50 less motor — job



Model B-2-A  
2 Ton Half Press  
\$84.50 job

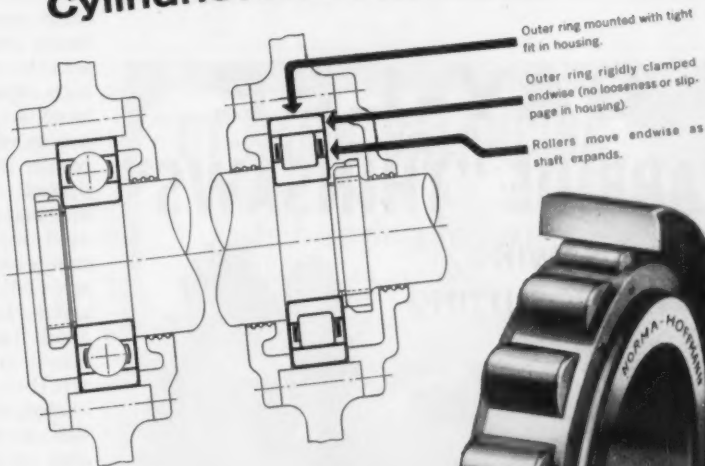
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## For Shaft Expansion and/or Heavy Radial Load...

### Use NORMA-HOFFMANN PRECISION Cylindrical Roller Bearings



Typical mounting using clamped ball bearing at lightly loaded end of shaft and clamped roller bearing at heavily loaded end.

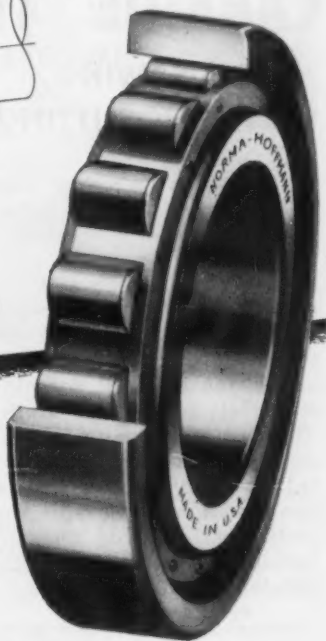
#### CHECK THESE ROLLER BEARING ADVANTAGES:

1. No looseness required between outer ring and housing — as with self-contained bearings.
2. No possibility of endwise cramping of bearings — a frequent cause of heating and early failure.
3. Extra quiet and trouble free operation — due to elimination of looseness.
4. Extra heavy radial load ca-

capacity plus resistance to shock and vibration.

5. Precision limits held throughout permit extra high speed operation.
6. Interchangeable with standard single row metric ball bearings.
7. Available also in several extra light series where overall weight is important.

Norma-Hoffmann Engineers, specialists in bearing design and application, will help you with your problems. Ask for their services or write for catalog.



precision ball, roller & thrust bearings



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BEARINGS CORPORATION • STAMFORD, CONN.

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For more data circle 559 on Reader Service Card

**new shop equipment . . .****HEAVY DUTY BAND  
SAWING MACHINE FOR  
HIGH SPEED PRODUCTION**

The development of a heavy duty band sawing machine, designed and built specifically to utilize the full cutting capacity of high speed steel band saw blades, has been announced by

The Henry G. Thompson and Son Co., New Haven, Conn. Produced by the American Machine and Foundry Company and jointly developed by AMF and Thompson engineers, this precision tool is known as the Milford Re-zistor Milband Machine. It was stated that the Milband is believed to be the first machine that truly provides the rigidity and all around ruggedness needed to withstand the wide range of

blade speeds and heavy feeds of which modern high speed steel band saw blades are capable. As a result, it is expected that the Milband Machine, used in conjunction with Thompson's Milford Re-zistor High Speed Steel Band Saw Blade or other similar band blades, will establish new standards of speed, efficiency, accuracy and economy in production cut-off operations.

The Milband provides a wide range of variable blade speeds, 40 to 360 feet per minute. As a result, the machine can readily be set to the optimum speed for cutting practically any metal from free machining Bess-mer stock to the hard to machine alloys like stain-

**GAY-LEE  
CARBIDE "THINSAWS"****FOR SAWING,  
SLOTING, SLITTING**

For fast, precision sawing, slotting or slitting, use a Gay-Lee "Thinsaw." Even when wafer-thin for delicate work, these saws maintain positive alignment and rigidity for full-depth cutting without run-out. Carbide tips for speed and long life, brazed into a special, patented seat that holds them firmly. Thickness as low as .030", thickness tolerance held to .0001", O.D. 1 1/4" to 10". For ferrous, non-ferrous, plastics, etc. Any tooth form available. Send details of your problem for recommendation and quotation.

*Patented—Manufactured under license.*



*\*With Gay-Lee patented construction, brazed teeth with circular seat definitely will not break loose from saw body.*



For more data circle 560 on Reader Service Card

less steel. For maximum operator convenience and efficiency, all machine motions are controlled from a single easy to reach panel at the front of the machine. Located immediately above the control panel is a "Job Selector" chart that guides the operator in selecting correct tooth per inch and blade speed for various sizes of stock and types of metal. A 3 h.p. drip proof motor provides more than ample power to drive the narrow band saw blade under the heaviest feeds. Hydraulic blade feed has been designed to maintain the value set by the operator at all times, automatically compensating for the greater resistance the blade meets as it cuts into cross sections of increasing thickness. This feature is especially valuable for cutting stainless steel, titanium and other similar hard to machine metals where the correct feed must be maintained at all times to prevent work hardening. Correct blade tension is set at the factory and is automatically maintained by a hydraulic tensioning cylinder.

To minimize blade flexing

stresses and insure maximum blade life, the Milband Machine is equipped with oversized 22 inch diameter blade wheels made of shock resisting Meehanite. Milband construction also provides a smaller angle of blade twist between the wheels and the guides. The carbide tipped, jam proof guides have been designed to provide rigid blade support and transmit the heaviest feed pressures without damage to



**"DY-NAMIC BALANCING**  
makes rolls run true —  
cuts bearing failure..."

...says J. Freeberg, Res. Eng., Ontario-  
Minnesota Pulp & Paper Co., Ltd.

## FREE CATALOG brings you up-to-date on DY-NAMIC BALANCING

See how Bear simplicity of operation eliminates noise and vibration in rotating parts quickly, accurately, economically. Read how Bear precision reduces wear of valuable machinery... cuts costs. 24 pages of installation pictures, diagrams, specifications—sent without obligation. Write Bear Mfg. Co., Dept. M-25, Rock Island, Illinois.



105

Profit by Ontario's  
experience with light  
paper machine rolls!

**SAVINGS**  
\$120 per roll by doing balancing jobs themselves.

**RESULTS**  
Unbalance corrected: 6 oz. to 40 lbs.

**IMPORTANCE** of Dynamic Balancing  
Static balancing found entirely unsatisfactory.

**VERSATILITY**  
Bear machine also balances electric motor rotors, centrifugal pump rotating assemblies.



# BEAR

STATIC AND DY-NAMIC BALANCING MACHINES

For more data circle 561 on Reader Service Card

**new shop equipment . . .**

the blade. Guides have adjustable blade contact area, insuring longest possible guide life. Efficient cleaning of the band saw blade is provided by a high pressure coolant stream as the blade leaves the cut. In addition, another coolant stream, positioned in front of the work, insures the quick re-

moval of chips from the cutting area.

Because a proper flow of coolant is essential to the cutting of modern alloys, the Milband is provided with a built in recirculating system with the reservoir located in the base of the machine. Adjustable nozzles allow directing the coolant streams to the cutting area for most effective cooling. Both coolant and hydraulic tanks are readily removable for easy cleaning

and are equipped with conveniently located filler caps and visual level indicators.

The Milband stock vise is hydraulically operated for fast, easy clamping and unclamping. Standard capacity is 10 by 10 inches, and construction permits adjustment for a very wide cutting angle (45 degrees). The design provides an unusually compact, efficient nesting attachment for gang cutting. For use when the machine is operated under manual control, a calibrated work step is provided. This facilitates fast, accurate cutting when more than one piece of the same length is required.

An important Milband feature is the automatic

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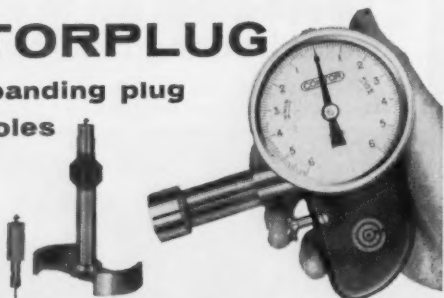
for tolerances down to .0001"

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1/8" to

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.0001"

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shows size (actual, fixed  
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. . . Used by the thousands in jet engine, automotive transmission, farm and road machinery, household appliance and other volume-precision programs.

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WALTHAM 54  
MASS.



**SEND FOR FULLY ILLUSTRATED BULLETIN 64**

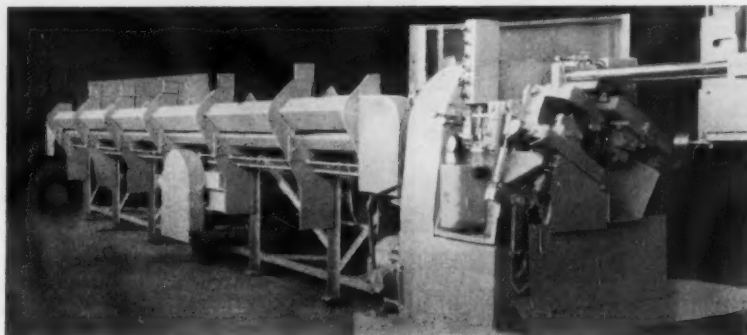
For more data circle 562 on Reader Service Card



## *Why Don't You* **GO MODERN?**

Willy, using grandpa's razor,  
Found it much too sharp and keen.  
He should get a modern type—  
A safety cutting-off machine.

### **The Modern Cutting-Off Machine and Loader**



Old methods of cutting-off tubing and bar stock, with tubing diameters up to 8 inches, have been made obsolete by the Modern Automatic Cutting-off Machine and Automatic Stock Feeder.

We have prepared a booklet describing this speedy, accurate, automatic machine. It contains valuable information for any organization interested in faster, cheaper cutting-off operations.

*Write for this booklet today!*

**MODERN MACHINE TOOL CO.**  
2005 LOSEY AVENUE  
Jackson, Michigan

For more data circle 563 on Reader Service Card

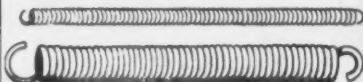
# REID TOOL ROOM NEEDS!

## COMPRESSION SPRING ASSORTMENT



Made from music wire. All sizes in diameters  $\frac{3}{32}$ " to  $1\frac{1}{2}$ ". All 10" long. Select the size required and cut to length wanted. Saves time and money.

## EXTENSION SPRING ASSORTMENT



Made from music wire. All sizes in diameter  $\frac{1}{8}$ " to 1". All 11" long with loop or hook at both ends. Cut to length desired.

## FREE 64 PG. CAT.

Listing numerous tool room needs such as plastic and steel ball handles, machine handles, hand wheels, hand knobs, etc.

**REID**  
TOOL SUPPLY CO.  
MUSKEGON HEIGHTS,  
MICHIGAN



For more data circle 564 on Reader Service Card

## new shop equipment . . .



*Milford Rezistor Milband Heavy Duty Band Sawing Machine for high speed production*

indexing bar feed. Available as an optional accessory, this mechanism makes operation of the Milband fully automatic. The machine attendant has only to clamp the stock (single bar or nested multiple pieces) in the machine's vise, set the dial for the stock length desired and start the automatic cycle. Stock length is maintained at a high degree of accuracy. For more data circle 125 on Reader Service Card

★ ★ ★

## SUSPENSION BALANCER HAS 6 FOOT TRAVEL

Two streamlined suspension balancers, featuring automatic no drop safety brake for the safe and convenient handling of air and electric tools, inspection gages, welding and other

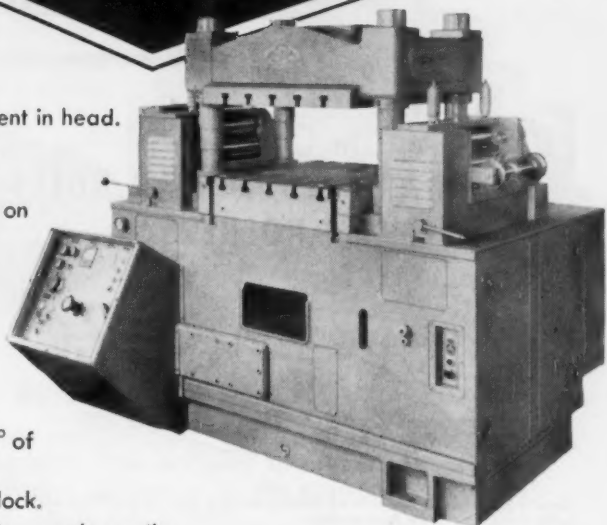


# ALPHA TWO POINT BACK GEAR UNDER DRIVE PRODUCTION PRESSES

Capacity of 75 to 200 tons

## Outstanding Features

- Shut height adjustment in head.
- Center drive type herringbone gears.
- Scrap cutter action on up-stroke of press.
- Cam adjustments for brake & roll feeds.
- Micro adjustment of metal travel.
- Timing of scrap cutter from 0° to 45° of up-stroke of press.
- Positive shut height lock.
- Bronze sleeve bearings replace gibs as utilized on conventional presses.



These precision presses are basically precision operating, high-speed automatic stamping presses. They have built-in precision in the same terms as the word "precision" is associated with modern machine tools. This inherent quality has been designed into these presses from the ground up.

**NO PITS REQUIRED.**

**UNBALANCED DIES** can be handled without distortion.

**FAST, ACCURATE, WILL GIVE LONG TROUBLE-FREE SERVICE and LONG DIE LIFE.**

**PRESSES UP TO 300 TON CAPACITY, AVAILABLE TO CUSTOMER PARTICULAR REQUIREMENTS.**



Write for Catalog

## ALPHA PRESS & MACHINE, INC.

9281 Freeland Avenue • Detroit 28, Michigan

For more data circle 565 on Reader Service Card

## new shop equipment . . .

equipment up to 10 pounds in weight, have been introduced by Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill. These balancers have been designated as the Model 5LB6, to suspend loads up to 5 pounds in weight, and the Model 10LB6 for equipment

weighing from 1 to 10 pounds. The built in brake on both models prevents loads from dropping under any circumstances. In addition, both balancers have full swivel upper hook for easy handling and long life, with an auxiliary suspension provision for double safety.

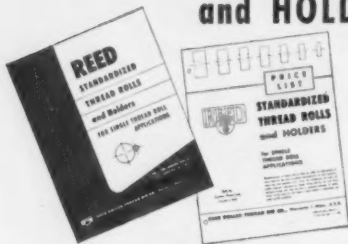
The spring reel cable devices hold equipment at operating levels and provide for automatic

retraction to any handle level between operations. The balancers, which have a 6 foot travel range, are externally adjustable for cable tension and travel as well as for operating and out of the way levels.

Other features of this LB Series Balancer include nylon sheathed steel aircraft cable, rubber cable stop and heavy gauge steel housing.

For more data circle 126 on Reader Service Card

## For Your Convenience in Ordering STANDARDIZED THREAD ROLLS and HOLDERS



Write for  
THREAD ROLL  
BULLETIN 1-16  
and  
PRICE LIST

Simplify ordering and save time by keeping on hand both the new Reed sales bulletin and price list for these products. Both tool engineers and purchasing departments appreciate the saving of time and effort made possible by being able to order Reed standard thread rolls and holders by number only, without the necessity of submitting drawings and specifications.

**ECONOMY...** Reed standardization of thread rolls has eliminated the need for many types of special rolls, with resulting lower prices and immediate delivery. Users also find it more economical to purchase Reed standard rolls and make their own slight alterations to meet special requirements.



For Single Roll  
Applications

HOLDERS and ROLLS  
for COMMON STRAIGHT THREADS  
and TAPER PIPE THREADS  
CARRIED IN STOCK



**REED ROLLED THREAD DIE CO.**

Specialists in Thread and Form Rolling Tools and Equipment  
WORCESTER 1, MASSACHUSETTS U.S.A.

For more data circle 566 on Reader Service Card



Thor Balancer

# Is There Anything We Can Help You Straighten Out?



## CHECKS AND BENDS IN THE SAME POSITION

Manufacturers with straightening, checking, and truing operations that require more than ordinary speed and accuracy have found Anderson Power Presses to be the answer to their problems. Here are the results they report:

*"Straightened 30 pieces per hour with former equipment. With Anderson Press, 120 per hour. Production increase 400%."*

*"Anderson Power Press with its complete attachments is definitely more flexible for all types of straightening operations. It is faster, more accurate, and pressure is easily controlled. It is simple to operate."*

*"Formerly had a tolerance on drawing of plus or minus .002". After installing Anderson Press changed drawings to plus or minus 1/2 thousandth."*

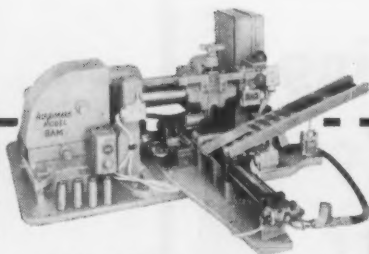
These actual reports from users prove that with an Anderson Power Press you get it straight — fast. Profit from low-cost high production, precision straightening.

Write for Bulletin 11-22.



**ANDERSON BROS. MFG. CO.**  
ROCKFORD, ILLINOIS

For more data circle 567 on Reader Service Card

**"ACROJET"**Model  
No. 9AM**Low Cost****Automatic Marking Machine**

For Automatic marking of parts or products that will roll down a chute or inclined conveyor, nothing is faster, quieter or requires less maintenance than the "ACROJET" Marking Machine.

The "ACROJET" is driven by a gear reduction motor that operates the slide type of marking head. 75 p.s.i. air operates the automatic feed and eject. Perfect for use in line of Automation. Does consecutive numbering, lettering, design on rings, tubes, bushings, sleeves, collars, collets, rolls, drills, taps, bolts, nuts, etc.

The only standardized machine of its kind. Write today for Series 9A Catalog and price list.

*The*  
**ACROMARK**  
*Company*

9 Morrell St., Elizabeth 4, N. J.

**"THE ORIGINAL MARKING SPECIALISTS"**

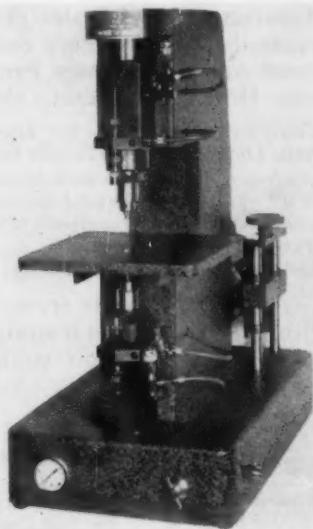
For more data circle 568 on Reader Service Card

**new shop equipment . . .****VERTICAL DEBURRING MACHINE**

Deburring both sides of holes in flat and thin sections is now practical with the alternating spindles on the vertical deburring machines manufactured by the Model Machine Co., Inc., 4729 Hawthorne St., Philadelphia 24, Pa. After the top spindle has finished deburring one side, it retracts and the bottom spindle then deburrs the other side. On thicker sections, a switch is provided to bring both spindles together at the same time. According to the manufacturer, holes 1/32 to 1/2 inch in diameter can now be deburred in less than half the time of previous methods.

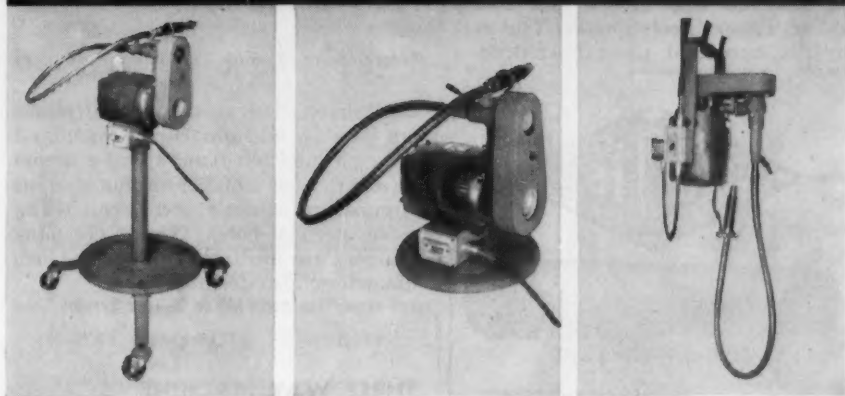
The machine is air operated through double acting cylinders and is foot controlled, thereby leaving both hands free to handle work.

For more data circle 127 on Reader Service Card

**Model Vertical Type Deburring Machine**

**R. G. Haskins Co.**

## FLEXIBLE SHAFT MACHINES



*faster*

Haskins machines will speed production on a big variety of metal-working jobs with their continuous speed and unerring performance. And there's no need to worry about changing tools—it takes just seconds to switch to any one of the numerous metal-working attachments in the Haskins line. *Use Haskins equipment and eliminate interruptions.*

*easier*

Haskins flexible shaft machines make the whole operation a simple matter. They're portable—ready to go to work in whatever spot you choose, even remote sections of your plant. Operators say Haskins machines are easy to use because they have to hold only the lightweight handpiece which permits greater accuracy for close, precision work. You should know about Haskins flexible shaft machines and accessories—*leaders in their field for over 30 years.*



**Write Today for a Catalog and Literature**

**R. G. HASKINS Co.**

2647 West Harrison Street

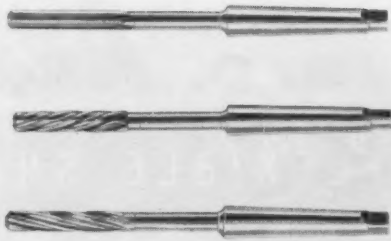
Chicago 12, Illinois

For more data circle 569 on Reader Service Card

**new shop equipment . . .**

**SOLID CARBIDE  
CHUCKING REAMERS**

Rotary Tool Industries, Inc., Dept. MM, 4461 West Jefferson Ave., Detroit 9, Mich., is now marketing a complete line of solid carbide chucking reamers with No. 1 and No. 2 Morse Taper Steel Shanks. The carbide is one solid piece brazed to a



**Rotary Solid Carbide Chucking Reamers**

steel shank. The straight fluted reamers have an odd number of flutes and the right and left hand spiral reamers have an even number of flutes, thus eliminating chatter and producing more perfect holes. These chucking reamers are available in  $\frac{1}{4}$  to  $\frac{3}{4}$  inch diameters, also decimal sizes.

For more data circle 128 on Reader Service Card

★ ★ ★

**THREE WAY MACHINE  
DESIGNED FOR FRAME  
ASSEMBLIES**

A three way machine has been developed by the National Automatic Tool Co., Inc., Richmond, Ind., for drilling the front section of automobile frame assemblies to exact accuracies in cross members.

This machine features a special horizontal unit with three heads. The outside heads have two stub spindles,



**SLEEVES  
AND  
SOCKETS**

**AND A  
complete line of COLLETS**

• COLLIS Taper Tools are made by men skilled in this type of manufacture. Users get long satisfactory service from COLLIS Equipment and find the answer to all drilling, reaming, and tapping needs in the COLLIS line. We can give prompt service on orders for Lathe Centers, Arbors, Drill Drifts, and Magic Type Chucks as well as on Sleeves and Sockets and Collets.

**THE COLLIS CO.**

**DEPT. A, CLINTON, IOWA**

For more data circle 570 on Reader Service Card

304 modern machine shop



Used by U. S. Armed Forces

**MACHINE TOOL  
RECONDITIONING**

and the Art of Hand Scraping (3rd printing). Send for free folder describing illustrated book.

**MACHINE TOOL PUBLICATIONS**  
324 Wabasha, 215 Commerce Bldg.  
St. Paul 1, Minn.

For more data circle 571 on Reader Service Card

November, 1957





## Can your tapper pass this Performance Test?

(CHECK IF "YES" ONLY)

- |  |  |
|--|--|
| <input type="checkbox"/> Maintains production for long periods | <input type="checkbox"/> Less operator fatigue             |
| <input type="checkbox"/> Fewer Broken taps                     | <input type="checkbox"/> Less "down time" interruption     |
| <input type="checkbox"/> Fewer spoiled pieces                  | <input type="checkbox"/> Maintains accuracy at high speeds |

**If You Cannot Answer Yes to Each of the Above... Your Tapper is Not Operating Efficiently**

Unquestionably, there is a difference in tapping heads and in Procunier you'll find that unmistakable difference. If your tapper is not producing up to par—regardless of your demands and schedules—it will pay you to check into the possibility of using Procunier. Designed by practical engineers, they have been consistently producing "profitably" under "back breaking" production schedules.

Procunier superiority can be attributed to many unique construction characteristics—a practical double cone cork faced friction clutch, wobble free spindle, quick start, stop and reverse mechanism, finger tip control, exclusive tap holder, plus a host of others.

Procunier heads are unduplicated for accuracy, dependability and all 'round efficiency. They are proven performers. Get the full story today. Write for free brochure.



### Free Brochure

giving the full, interesting Procunier Story with parts chart and graph on the complete Procunier line.

# PROCUNIER

## Safety Chuck Co.

12 S. Clinton St.,  
Dept. 11

Chicago 6, Illinois

### PROCUNIER SAFETY CHUCK CO.

12 S. Clinton St., Chicago 6, Ill. Dept. 11

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

City.....Zone.....State.....

Name.....

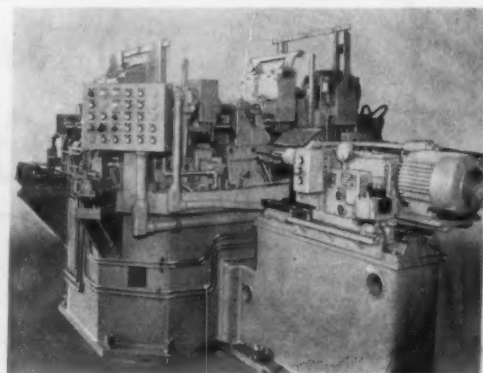
Address.....

For more data circle 572 on Reader Service Card

### **new shop equipment . . .**

each pointing toward the center, and the center head has two stub spindles on each side, pointing toward the outside heads. All heads have a common mounting and move together, first in one direction to drill the cross members from one side, then in the opposite direction for the opposite holes.

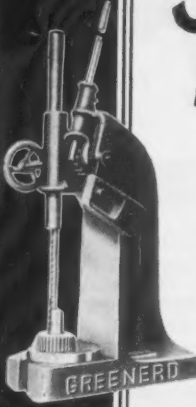
The welded frame assembly comes to the machine by a conveyor and the machine hydraulically lowers the part and clamps it into position. At the start of the drilling cycle, two two-spindle drilling units come in from each side to combination drill and ream two 9/16 inch diameter holes in the sides of the frame. At the same time, the multi-head moves at right angles to drill, ream and chamfer four 7/8 inch holes in the cross members



**Natco 3 Way Machine for frame assemblies**

from one direction, then reverses its direction to perform identical operations on the opposite sides of the cross members. Accuracy has to be such that a rod, 0.010 inch undersize, can be

★ ★ ★ ★ ★



## **Greenerd**

### **PRESSES**

#### **ARBOR & HYDRAULIC**

for . . .

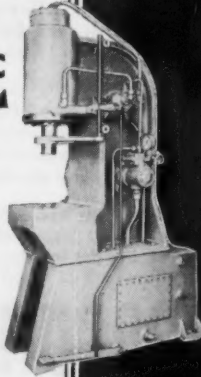
- **ASSEMBLING**
- **BROACHING**
- **FORMING**
- **STRAIGHTENING**

Rack and Pinion Arbor Presses.  
Hydraulic presses made to conform to J.I.C. standards. Pictured at right is 15-ton hydraulic press.

LISTED IN SWEET'S MACHINE TOOL CAT.  
OR WRITE TODAY FOR CATALOG #354.

## **Greenerd ARBOR PRESS CO.**

**41 CROWN ST. NASHUA, N.H.**



**EQUIP FOR THE SIZE OF THE JOB**

**LEVIN<sup>®</sup> TURRET LATHES**

**PRODUCE SMALL INSTRUMENT PARTS BETTER**



A small precision turret lathe for second operations and production of instrument parts. Available in two collet capacities, 5/16" or 3/16". The 6 position turret is self indexing and has hardened ways. Turret holes are 1/2" diameter. Turret travel 1-5/8". The cross slide has a swivel side at one end and a rigid tool block at the other. Lever collet closer provides quick opening and closing. A variety of turret tools with 1/2" shanks is available.



Send for catalog M describing complete line of instrument lathes, micro-drilling equipment and accessories.

**Louis Levin & Son, Inc., 3610 S. Broadway, Los Angeles 7, California**

### new shop equipment . . .

passed through holes in both cross members freely. Upon return of the heads to the start position, the part is unclamped and elevated to the level of the conveyor. The machine cycle time is claimed to be approximately 60 seconds for all operations.

For more data circle 129 on Reader Service Card

★ ★ ★

### LIGHTWEIGHT MAGNESIUM SCRIBER

The Challenge Machinery Co., MMS-9, Grand Haven, Mich., now has available lightweight magnesium scribes for use in tooling, styling, model and pattern shops. They weigh only 12 ounces per foot, one quarter the weight

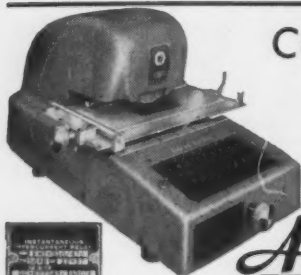


Challenge Lightweight Magnesium Scribes

of steel units, and are available in six standard sizes up to 48 inches in length.

The light weight of these magnesium scribes makes them particularly handy for the accurate measuring of large models. The working surfaces of the tools are hand scraped to an accuracy of 0.001 inch. A tip of hardened and ground tool steel is provided.

For more data circle 130 on Reader Service Card



**MODEL EMT-1**  
**ELECTRIC TAG TYPEWRITER**

A touch of the finger delivers up to 2 tons pressure for deep, legible impressions in plastic or metal tags.

#### MODEL SRST-2

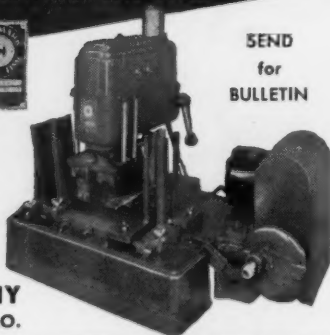
#### HI-SPEED TAG MARKING MACHINE

Automatically marks BOTH constant and serial numbers at any desired speed up to 8,000 tags per hour!

MANUFACTURERS' AGENTS  
Some Territories Still Available

### DEFIANCE MACHINE & TOOL COMPANY

1920 S. VANDEVENTER • DEPT. MM • ST. LOUIS 10, MO.



SEND  
for  
BULLETIN

## CUT PRODUCTION COSTS!

MARK

## NAME PLATES

5 TIMES FASTER

-WITH-  
*Automark*

ELECTRIC TAG MARKING MACHINES

For more data circle 575 on Reader Service Card



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

*This die head is unique*

## **THERE IS NO OTHER LIKE IT**

It cuts threads with insert chasers. These are, in reality, small sections of the business end of large and expensive chasers, but with this important difference: *their cost is so low they can be even thrown away when dull.* For example, for less than \$50 you can get a dozen sets of insert chasers, each set ground ready to go. Change now to insert chaser die heads and watch your performance improve.

**"Unified and American Screw Thread Digest"**  
*sent free on request.*

# **THE EASTERN MACHINE SCREW CORPORATION**

**40-50 BARCLAY ST.**

**NEW HAVEN, CONN.**

For more data circle 576 on Reader Service Card

November, 1957

modern machine shop 309

## new shop equipment . . .

**GEAR HOBBER FEATURES  
UNITIZED CONSTRUCTION**

A high speed gear hobber, the Model 1458-B, has been developed by Michigan Tool Co., 7171 East McNichols Rd., Detroit 12, Mich. The 1458-B is the latest addition to the company's Ultra-Speed line of hobbers and is a

**T. H. LEWTHWAITE MACHINE CO.**

317 East 47th St. • New York 17, N. Y.

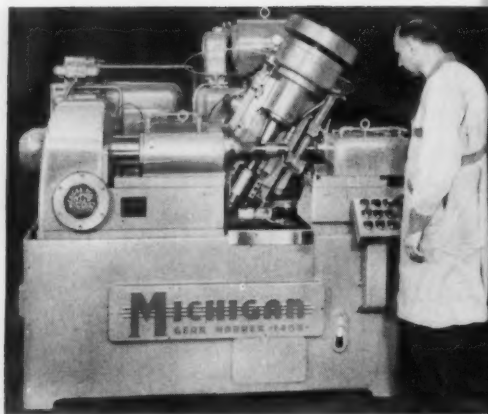
Correct clearance between the punch and die for both type and thickness of metal being punched is essential for efficient and clean punching. Our large, planned stocks were built with this in mind.

Send for new catalog sheets on our complete line, which include charts and instructions on figuring clearances.

Using the right tools for the specific work will enable you to get the full benefit of the exceptional durability of

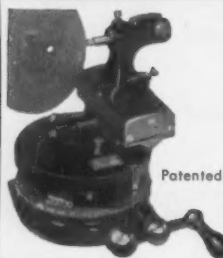
*Lewthwaite***Punches & Dies**

For more data circle 577 on Reader Service Card



Michigan Model 1458-B Gear Hobber

horizontal single spindle machine that is versatile enough for small shops, yet easily installed in automated gear lines of big plants. The hobber has an 8 inch center distance between the hob arbor and the work spindle. The entire hobbing cycle is fully automatic with the machine returning to the loading position upon completion of the part. Loading and cutting time for most gears is measured in seconds. Either conventional or climb hobbing may be used with single or multiple thread hobs. Both gear washers and gear classifiers can be easily integrated with the machine. Automatic size control can also be provided. The Model 1458-B Hobber is more than an im-



Patented

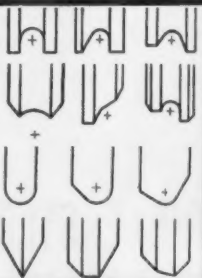
**WHY WASTE TIME?**

Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

Write for Price and Folder.  
Representatives Wanted in Some Areas.

**JEON MANUFACTURING CO.**

P. O. BOX 6750 WASHINGTON 20, D. C.



For more data circle 578 on Reader Service Card



# Bill Proves ...

You Can Single Point Thread  
On A Reversible Lathe  
In Half The Time  
With A Spee-D-Thred

SAY BILL, HOW DO YOU  
FINISH THOSE SINGLE  
POINT THREADING  
JOBS SO FAST?

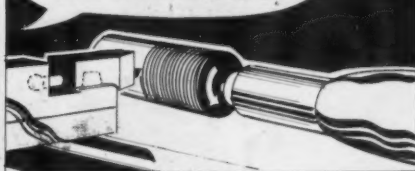
THAT'S EASY, JOE. I  
USE A SPEE-D-THRED.  
IT CUTS THREADING  
TIME 50 TO 70% ...  
AND MAINTAINS  
ACCURACY TOO.



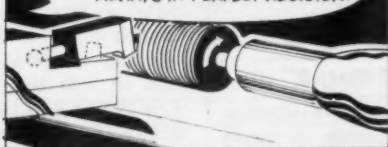
THE SPEE-D-THRED HAS AN UPPER AND LOWER ANVIL. THE UPPER ANVIL HAS A TAPERED HOLE WHICH FITS ONTO A CONE OF THE LOWER ANVIL. EXTREME ACCURACY OF MANUFACTURE ASSURES A REPETITIVE CUT AND CUTTING OF THREADS AS ACCURATE AS THE LATHE.



I SET THE TOOL FOR THE DEPTH OF THE FIRST CUT, LOCK IN THE LEAD SCREW AND MAKE THE FIRST CUT. IN CUTTING, THE ANVILS ARE HELD TOGETHER BY THE DOWNWARD CUTTING FORCES. THESE ANVILS GIVE ABSOLUTE RIGIDITY AND NO CHATTER. I USE EITHER THE CROSS SLIDE OR THE COMPOUND.

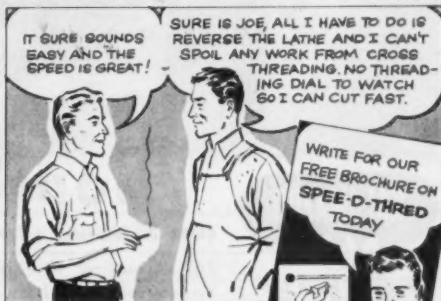


AT THE END OF THE CUT, I REVERSE THE SPINDLE, WITH THE LEAD SCREW STILL LOCKED IN. NOTICE THE UPPER ANVIL RISES TO ALLOW THE HEEL OF THE TOOL TO RIDE THE THREAD BACK WITHOUT MARRING. THEN IT DROPS INTO PLACE FOR THE NEXT CUT. YOU DON'T BACK OFF THE CROSS SLIDE OR DISENGAGE THE FEED NUT, AND THE LEAD SCREW IS ALWAYS IN PERFECT REGISTER.

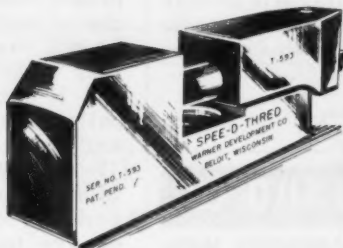


IT SURE SOUNDS  
EASY AND THE  
SPEED IS GREAT!

SURE IS JOE, ALL I HAVE TO DO IS  
REVERSE THE LATHE AND I CAN'T  
SPOIL ANY WORK FROM CROSS  
THREADING. NO THREAD-  
ING DIAL TO WATCH  
SO I CAN CUT FAST.



WRITE FOR OUR  
FREE BROCHURE ON  
SPEE-D-THRED  
TODAY



Spee-D-Thred  
WARNER DEVELOPMENT CO.

MAKERS OF HIGH SPEED THREADING TOOLS FOR LATHES

P. O. Box 1633 • ROCKFORD, ILLINOIS

For more data circle 579 on Reader Service Card

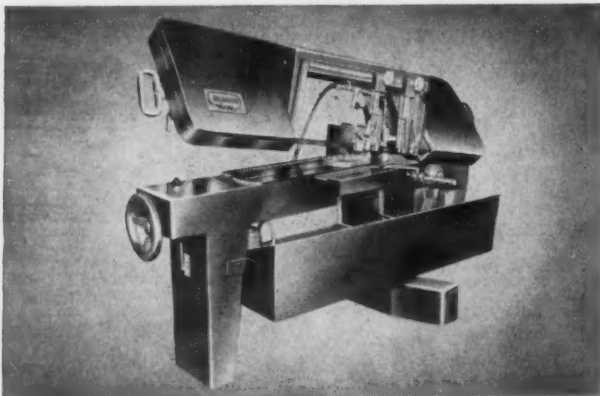
## new shop equipment . . .

proved version of its widely accepted predecessor. Although retaining many features of the prior model, it is an entirely new machine with an in-board mounted guide assembly that introduces the lead to the work spindle while the work is being traversed across the hob. The guide facilitates straight gear hobbing and, for spiral

gears, it controls the helix angle that is being cut.

The 1458-B is of unitized construction—all of the necessary assemblies of the machine are mounted on a common surface of the machine base. The manufacturer claims that this makes maintenance easy and reduces downtime substantially. Unusually high structural rigidity is offered in all base and housing elements. The machine weighs about 16,000 pounds.

## FIRST 8-INCH METAL CUTTING SAW TO MEET TODAY'S NEEDS



**KALAMAZOO**

Kalamazoo Metal Cutting Band Saw Machines:

**KALAMATIC BAR FEED** for Kalamazoo.

**MODEL 1220** cuts 12" round, 20" flat.

**MODEL 610** cuts 6" round, 10" flat.

## MODEL 8C

**cuts 8" round, 16" flat, 8" pipe**

Instant-acting vise holds work-piece. Four speeds for best cutting. Accuracy easily controlled—blade action in cut easy to see. Blades changed in seconds. Automatic shut-off. All parts readily accessible. Ask your Kalamazoo dealer to demonstrate Model 8C.

MACHINE TOOL DIVISION

**Kalamazoo TANK and SILO CO.**

1157 HARRISON ST.

KALAMAZOO, MICH.

For more data circle 580 on Reader Service Card

The Model 1458-B hobs up to four pitch spur or helical gears. Maximum center distance, hob arbor to work spindle, is 8 inches. Maximum cross-feed stroke of the hob is 5 inches. Either right or left hand helix angles up to 35 degrees can be hobbled.

In operation, the hob is plunged into the work by a Z bar mechanism, eliminating the approach feed and offering a reduction in hob time. The Z bar can be disengaged for conventional approach feed. The plunge feed is infinitely variable from 0 to 0.800 and is hydraulically operated and controlled. The hob slide is adjustable (independent of the plunge feed) to

# NOW BETTER GROUND FINISHES!

*with J&S guaranteed\* self-adjusting  
live centers*



**ACCURACY .0001"**  
OR LESS  
**FOR LATHES, GRINDERS**  
**PERFECTION LIVE CENTERS**  
SPINDLE TYPE

## SIMPLE DESIGN:

Only six parts. One-piece main body serves as cup for roller bearing on which spindle turns. Allows much greater capacity bearing in same size body.

## AUTOMATICALLY ADJUSTS FOR WEAR:

End thrust from work keeps tapered roller bearing perfectly seated—bearing cone and inner race of ball bearing are pressed on spindle; outer race is a light press fit into main body.

## ABSOLUTE CONCENTRICITY AND ALIGNMENT FOR BEARINGS:

Both conical and cylindrical bores of body are ground at same setting in work head. Point is ground under load in its own bearings to insure running dead true.


### TAPERS AVAILABLE

MORSE	JARNO	B & S	NORTON	LANDIS
2 to 7	6 to 20	7 to 18	10 to 24	.8125 1.3350 1.7500

SPECIAL POINTS, HEADS, SHANKS AND TAPERS MADE TO ORDER

### FOR INFORMATION

See your industrial distributor or write for free literature.



**J & S TOOL CO., INC.**

WHEEL DRISSEYS    SAW CLAMPS • PRECISION WISES • DOWN-HOLDING DEVICES

**CLAMPCUT**

ONE SHOPS

**871 DORSA AVE.  
LIVINGSTON, NEW JERSEY**

For more data circle 581 on Reader Service Card

## new shop equipment . . .

cut a desired size gear, and can then be locked in place in order to eliminate backlash.

Work rotation is controlled from a preset timed relationship with the hob through conveniently located change gears at the rear of the machine.



**DRILL and  
PILOT  
BUSHINGS**  
*Frictionless  
—Rotary*

For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details.

**GATCO ROTARY BUSHING CO.**  
42330 Ann Arbor Road, Plymouth, Michigan

For more data circle 582 on Reader Service Card

## economically priced press room equipment

### DURANT Automatic Stock Reels

Operates by natural spring of uncoiling stock. Priced from \$75.00. Nine other models of stock reels in vertical, horizontal, motorize or automatic types for all applications.

Manufacturers of Stock Reels, Roll Feeds, Straighteners, Scrap Choppers, Die Pullers, Foot Presses, Coil Cradles, Press Guards, Stock Oilers.



WRITE FOR NEW FREE CATALOG

**DURANT TOOL SUPPLY CO.**  
PROVIDENCE 3, RHODE ISLAND

For more data circle 583 on Reader Service Card

The work spindle assembly is mounted on a dovetail slide. Two 5 inch hydraulic cylinders, mounted on the same slide, provide ample power for crossfeed.

An adjustable stop screw is provided for the purpose of positioning the work in proper relations to the job at the starting position.

Two separate adjustments can be made to the hob head: namely, hob thread angle and automatic hob position shift.

The spindle is of a heavy duty design mounted on Timken bearings, and has a recess 23 inches deep for positioning long shaft gears. The work spindle is powered through an adjustable anti-backlash Cone-Drive worm set.

The hob spindle, which is also mounted on Timken bearings, is powered through a minimum number of gears. The spindle is housed in a dovetail slide that moves up and down for the purpose of hob shift.

The slide is hydraulically locked during the cutting cycle to make one rigid assembly. A flywheel located on the hob spindle drive dampens torsional vibration.

Hob shift is hydraulically actuated and infinitely adjustable in increments from 0 to 0.100 inch to a maximum of 4 inches. Adjustment, including helix angle can be quickly and easily dialed.

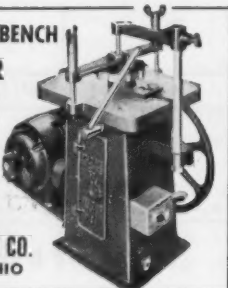
For more data circle 131 on Reader Service Card

### READING BENCH KEYSEATER

Portable — move directly to job; a time saver for both small and large shops.

3 1/2" stroke; adaptable for other work. Low first cost — prompt delivery.

Good dealers wanted.  
**READING MACHINE CO.**  
CINCINNATI 37, OHIO



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### Machine Surfaces and Profiles WITHOUT RESETTING WORK



with the  
**JEMCO  
H-20**  
tool room  
shaper  
Furnished  
complete with

Dividing  
head with  
tail stock

2 work hold-  
ing fixtures

Swivel vise

Large work table  
with locking jaws

- Accommodates wide variety of precision work within a range of 8" x 11 1/2"
- Accurate to within  $\pm 0.0005$ " within 6"
- Changes strokes by switch control to either 60 or 120 min.



EXCLUSIVE TERRITORIES OPEN

write for complete information and prices

**Jersey manufacturing co.**

401-C LIVINGSTON ST. • ELIZABETH, N. J.

For more data circle 585 on Reader Service Card

### Precision Sharpen Your Die- Sinking Cutters on an **ALEXANDER** Bench Grinder!



Over 1,000 sold in United States.

Write to Dept. C for catalog.

**J. ARTHUR DEAKIN & SON**

150-28 Hillside Ave., Jamaica 32, N. Y.

For more data circle 586 on Reader Service Card

# NUMBERALL

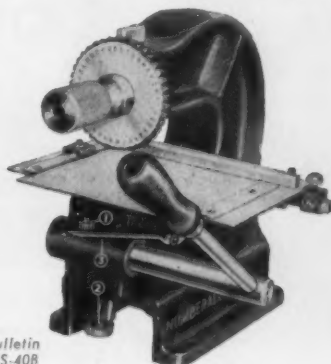
CUTS THE COST OF STAMPING NUMBERS

## Numbering and Lettering Press Mono Wheel Automatic Spacer

Designed for the purpose of impressing Letters and Numbers in all kinds of Name Plates and Flat Metal Parts. The Dials  $3\frac{3}{4}$ " Diameter are made of Special High Grade Tool Steel, scientifically hardened and tempered. The Characters are carefully engraved and make clear cut impressions of uniform depth. Standard Dials are engraved with 40 characters. Character Heights as follows: 1/16, 3/32, 1/8, 5/32, 3/16". Different size Dials are interchangeable. Carriage Table advances one space with each impression of the Dial, like a typewriter, doing rapid work, even spacing and perfect alignment.

Plates up to 5" wide and 6" long can be stamped, but can furnish a longer Table and Rack if required. Depth of impressions is adjustable by a screw on bottom of machine. A direct sight gauge is provided, to facilitate stamping in the proper place.

**NUMBERALL STAMP & TOOL CO.**  
HUGUENOT PARK STATEN ISLAND 12, N. Y.



Bulletin  
MS-40B  
on request.

Model No. 40B

For more data circle 587 on Reader Service Card

## **new shop equipment . . .**

### **21 AND 24 INCH LATHES**

The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio, has announced the availability of its 21 and 24 Inch Regal Lathes, which are claimed to give capacity, speeds and horsepower usually found only in heavier type machines.

Both models can be obtained with standard 7½ and optional 10 h.p. for high speed ranges, electric clutch and brake, feed reverse at the apron, heat treated gears in the head and quick change box and apron. Other features include headstock with combination gear-belt drive construction.

The bed has hardened and ground replaceable steel ways, fitted according to the compensating vee-way principle to insure better distribution of forces for long time accuracy and minimum wear. Both feed rod and preloaded precision leadscrew are provided for a continued accuracy in thread chasing, three bearing spindle, automatically lubricated quick change box, wide car-

riage bridge with ample bearing surface and rugged tailstock with plug clamping.

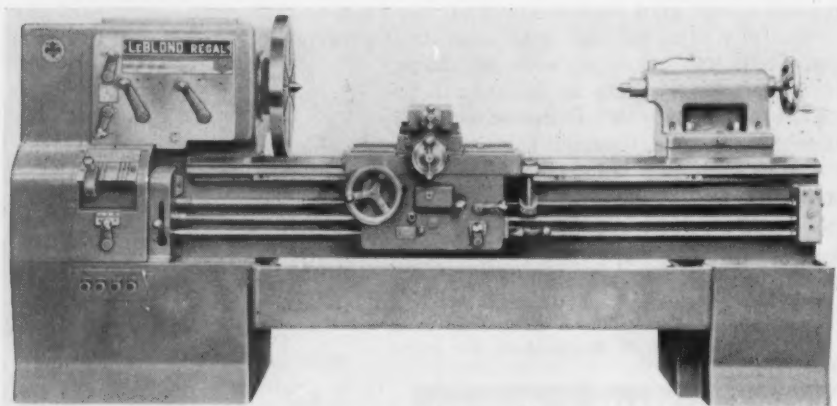
For more data circle 132 on Reader Service Card

★ ★ ★

### **BAND SAW AUTOMATICALLY REGULATES BLADE PRESSURE**

The Peerless Machine Co., Racine, Wis., recently introduced its High Speed Production Band Saw, which provides industry with a metal cutting machine for sawing billets, heavy bars, pipes and structural shapes. This is a machine that is claimed to literally think for itself. This practical, rugged machine is equipped with a compensating feed unit which automatically regulates blade pressure at all times, maintaining the sawing operation at 100 per cent efficiency and eliminating blade breakage. It automatically controls blade pressure for changes in size, shape and hardness of material cut and blade dulling.

The Peerless Band Saw has a counterbalanced saw frame, which protects the work, the blade and the operator. Under no circumstances can the frame fall on the work. The counterbalance



*LeBlond Regal Lathe features a large swing, 10 h.p. and feed reverse at the apron*



**SAVE MONEY**

WITH

**PO-RO**  
PRODUCTS**LEAD HAMMER  
MOLDS--HANDLES  
& LEAD ALLOY**

For those in the industry who prefer to make their own soft hammers.

For all others we have a

**LEAD HAMMER EXCHANGE SERVICE**

Purchase initial supply, beat them up then exchange for new ones at half cost.



DEALERS WANTED \* BROCHURES AVAILABLE

**PODLIN TOOL CO.** 11917 FRANKLIN AVE.  
FRANKLIN PARK, ILL.

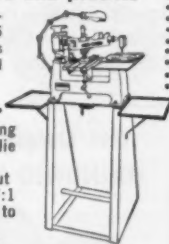
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how to get . . .

**faithful  
3-dimensional  
reproduction**

*in steel, other metals and plastics*

Use the LOW COST precision-built Preis Panto 3D-5 Engraving Machine. Does both 2 and 3 dimensional engraving effortlessly.



- Reversible spindle for enlarging or reducing from a model, die or sample
- Precision ball bearings thruout
- Reduction ratio range: 1.6:1 to 7:1
- Four spindle speeds—7,000 to 18,000 RPM
- Micrometer adjustment collar
- Provided complete with floor stand and work tables

TRADE MARK

**PANTO**

Write for complete details and prices. For immediate attention write directly to manufacturer below. Ask for nearest representative.

**H. P. PREIS ENGRAVING MACHINE CO.**  
657 U.S. Route 22, Hillside, N. J.

For more data circle 589 on Reader Service Card

**STERLING "G-2" with 25° Tilting Spindle  
for FAST, ACCURATE  
Tool & Cutter Grinding**

The **STERLING 25° Tilting Spindle** provides faster set-ups, positive clearance angles, accurate grinding, extra capacity and versatility. Available in Plain and Universal Models.

Sharpen Drills  $\frac{1}{8}$ " to  $2\frac{1}{2}$ ", 90° to 140°  
Included Angle on ONE Drill Grinder

STERLING "DV" grinds drills accurately with pre-determined clearance and included angles, plus free cutting conical grind.

Ask your McDONOUGH Dealer or write for Bulletins

**MCDONOUGH****MANUFACTURING CO.**

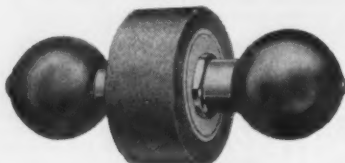
1521 GALLOWAY • EAU CLAIRE, WIS.

For more data circle 590 on Reader Service Card

### new shop equipment . . .

holds the frame up and prevents accidents. The dual feed single lever control means new operator convenience. Simply set the control. No further attention is required to insure that the blade is cutting as deeply as possible

#### THE Original METCALF GRINDING WHEEL DRESSER



**BALANCED**  
**FAST—COOL CUTTING ACTION—**  
**HIGH SPEED WHEEL FORMING**  
**and CRUSHING**

COMPLETE ASSEMBLY .....\$7.95  
EXTRA WHEEL .....\$1.50

Made by the World's Largest Manufacturers of  
SAW SHARPENING and KNIFE GRINDING  
MACHINERY

#### HANCHETT MANUFACTURING COMPANY

Main Office  
Big Rapids, Michigan

West Coast  
Portland, Oregon

For more data circle 591 on Reader Service Card



Peerless High Speed Production Band Saw

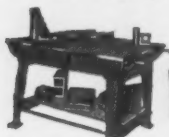
at a practical feed pressure. All the controls for the band saw are placed on one handy panel for operator convenience.

The Peerless Band Saw has been designed from the ground up to assure maximum rigidity and speed for general purpose or production sawing.

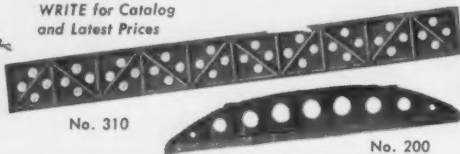
Construction features include a fabricated steel base, rugged cast iron table, cast iron swivel adjustable vise jaws, rigid saw blade guide frame, counterbalanced saw frame, unique ad-

## MILWAUKEE *Precision* EQUIPMENT

Designed and finished to assure true dimensional accuracy.  
Made from highest grade semi-steel.



WRITE for Catalog  
and Latest Prices



No. 310

No. 200

**SURFACE PLATES**  
**ANGLES • PARALLELS**  
**STRAIGHT EDGES**



**J. C. BUSCH COMPANY** **50 Years** 1907 **of Service** 1957

126 E. Pittsburgh Ave., Milwaukee 4, Wis.

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## BARCO BULLETIN Q200 on GOLD WATERLESS DEGREASING

Request Newest Data on  
SAFE Care of all Machinery,  
Motors, Tools, Dies, Fixtures,  
Etc. • Approved by Under-  
writers' Labs. Inc.



**BARCO Chemical Products Co.**  
701 S. LaSalle St. Chicago 5, Illinois

For more data circle 593 on Reader Service Card

## CAM MILLING JIG BORING



A SPECIALIZED CAM  
MILLING SERVICE.  
JIG BORING  
... SPOT WELDING  
... CONTRACT PRODUCTION  
EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO 52-CM

**EISLER ENGINEERING CO., INC.**  
734 S. 13TH ST., NEWARK 3, N. J.

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## The New SCHERR MICRO-PROJECTOR

with the  
VERTICAL design

NEW  
**1957**  
SELF CONTAINED  
IMPROVED MODEL

FEATURING

✓ RIGID FLOOR BASE - ELIMINATING EXTRA CHARGE FOR TABLE

✓ TILTING STAGE FOR HELIX, ANGLES AND BEVELS

✓ 4" DIA. STAGE OPENING

✓ COLUMN SLIDE ADJUSTABLE FOR WEAR BY MEANS OF GIBS - WILL HOLD SQUARE INDEFINITELY.

✓ CUSTOM MADE PRECISION COATED LENSES &amp; DOUBLE CONDENSERS FOR DIFFERENT OBJECTIVES 10 TO 100X MAGNIFICATION.

✓ AN ENTIRELY NEW PRACTICAL DESIGNED TOOL FOR INSPECTION DEPARTMENT AND PRODUCTION SHOP.

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COMPLETE LINE OF PRECISION INSTRUMENTS  
200-MM LAFAYETTE STREET • NEW YORK 12, N.Y.

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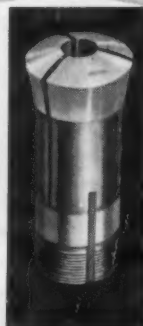
## ROYAL Self-Releasing Collets with Clover Leaf Grind

Royal specialization pays off. The new Royal self-releasing collets have won wide acclaim for their ease of handling and production savings. Specify Royal and get these plus features at no extra cost!

\*Also Milling Machine Types 9B&S, 7B&S, 2MT, R8

\*Special Collets Made To Order

Available in  
5C, 3C,  
3AT, 6AT



## a new concept in COLLET DESIGN

by ROYAL

- Real spring tension
- Wider opening
- No gauge fit for secondary operations
- Parallel bearing surfaces prevent wear
- No binding on closing and releasing
- Properly heat treated
- Made of selected steel
- Rigidly inspected



Write or call today for literature and price list on Royal Self-Releasing Collets, Handwheel Draw Bars, and Spring, Step, and Milling Machine Type Collets.

**ROYAL PRODUCTS, 84 Union Street, Mineola, L. I., N. Y., Pioneer 6-4245**

For more data circle 596 on Reader Service Card

**new shop equipment . . .**

justable long lived blade guides, centralized machine control, positive automatic blade tensioning, compensating hydraulic feed pressure on the blade, variable speed drive, quick acting hydraulic vise, efficient coolant system—steady coolant flow from large capacity centrifugal pump—and anti-friction bearings at all main load bearing points for added rigidity.

For more data circle 133 on Reader Service Card

★ ★ ★

### **AUTOMATIC WET SURFACE GRINDER**

Lempco Industrial, Inc., Machine and Tool Division, Dunham Rd., Bedford, Ohio, has announced its No. 545 Automatic Wet Surface Grinder.



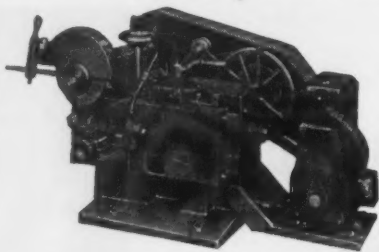
*Lempco Automatic Wet Surface Grinder*

The Lempco No. 545 is furnished in four bed sizes to handle 11½ by 38, 62, 86 and 110 inch work. Also, two

## **This Investment PAYS OFF**

**Automatic Metal Saw Grinder Cuts Costs**

**. . . Makes Money For You!**



3803 Ridge Road  
Cleveland 9, Ohio

Wardwell's "35-T" will sharpen up to 115 saws .015 thick at one time. This includes slitting and screw slotting saws and milling cutters. Takes saws from 2" to 5½" diameter. Completely automatic. No attention is required after machine is started. These ingenious, compact and sturdy grinders are saving and making money for their owners all over the world.

Write for Bulletin 35T

**Maker of Largest Line of Saw and Tool Sharpening Machines**

For more data circle 597 on Reader Service Card



### TAP BUSHINGS

Drives all standard taps from No. 0 to 1 1/8" and pipe taps from 1/8" to 1". Five o.d. sizes.

LESS TAP BREAKAGE  
LESS TAP WEAR

Write for Bulletin

**BYCO INDUSTRIES**

2200 SNELLING AVE., MINNEAPOLIS, MINN.

For more data circle 598 on Reader Service Card



"Jorgensen"  
and "Pony"

**CLAMPS**

ASK YOUR SUPPLIER.  
send for free catalog.

the clamp folks /

**ADJUSTABLE CLAMP CO.**  
436 N. Ashland, Chicago 22, Ill.

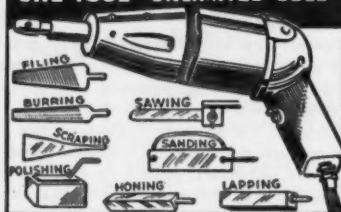
For more data circle 599 on Reader Service Card

### B-R-E-A-K...

### Hand Finishing Bottlenecks

with Portable • Electric  
Reciprocating Tools

#### ONE TOOL—UNLIMITED USES



These handy tools will cut out many tedious hand filing and finishing operations—Increase Production—Produce Uniform Work.

Light in Weight—Delivers 1/8" or 3/8" fixed stroke at 1000 strokes per minute—Operates on 110 volts AC or DC.

**ACME TOOL COMPANY**

73 WEST BROADWAY NEW YORK 7, N. Y.

For more data circle 600 on Reader Service Card

November, 1957

Another

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Lowest Prices

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### DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
1/4	\$ 6.00	\$ 2.85
1/2	12.00	5.00
3/4	21.00	7.50
1	30.00	10.25
1 1/2	54.00	15.00
2	75.00	20.00
2 1/2	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order today—Immediate  
Delivery From Stock!

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**MACHINERY EXCHANGE, INC.**

Dealers in Tool Room Equipment

Dept. B, 251 Centre St.

Tel.: Canal 6-5575, New York 13, N. Y.

For more data circle 601 on Reader Service Card

modern machine shop 321

**new shop equipment . . .**

types of grinding wheel traverse may be ordered; the "G" Models with a constant traverse of 45 inches per minute and the "E" Models with an infinitely variable traverse permitting speeds from 0 to 42 inches per minute.

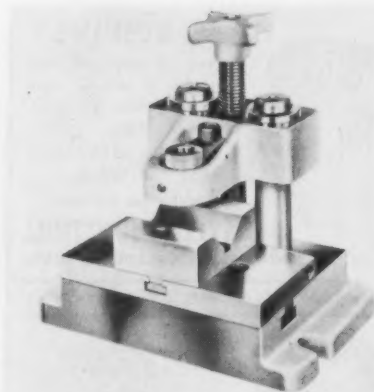
Optional features include magnetic chucks, automatic downfeed with or without automatic stop, multiple wheel heads, trunnioned chucks and special bed designs.

For more data circle 134 on Reader Service Card

★ ★ ★

**ADJUSTABLE VEE BLOCK DRILL JIG**

Rockford Engineered Products Co., 2324 Twenty-Third Ave., Rockford, Ill., recently announced its Repco Adjustable Vee Block Drill Jig, which



**Repco Adjustable Vee Block Drill Jig**

has been designed to cut costs on precision center or off center drilling, tapping and reaming. Standard equipment of this drill jig includes two interchangeable vee blocks, three inter-

★ ★ ★ ★ ★

**People work better when they SEE BETTER®**

At Allen B.  
Du Mont  
Laboratories  
Inc. —

*Using Magni-Focuser to inspect the glass neck assembly of a television picture tube*

**MAGNI-FOCUSER'S**

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

**MAGNI-FOCUSER**

**SPEEDS PRODUCTION  
With Third Dimensional (3-D) Vision  
Leaves both hands free to work**

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

**Send for descriptive folder**

**EDROY PRODUCTS CO.**

480 Lexington Ave.,  
Dept. P, New York 17, N. Y.

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## CAMS

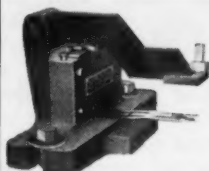
Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

**Your Inquiries Answered Promptly**

**HIMOFF MACHINE CO., INC.**

23-16 44th Road Long Island City 1, N. Y.

For more data circle 603 on Reader Service Card



### New Low Cost AUTOMATIC SCRAP CHOPPER

3" wide \$69.00  
6" wide \$95.00  
12" wide \$195.00

Write for details

**JACO DEVICES, INC.**

98 High St., Hingham, Mass.

For more data circle 604 on Reader Service Card

# CLIPPER

## PRECISION DIAMOND TOOLS

Industrial Diamonds

Thread Grinders

Turning Tools

Engraving Tools

Dressing Tools

Diamond Powder



### Manufacturers of DIAMOND WHEELS

and Hones of  
highest quality.  
Prompt delivery.  
Ask for literature

Representatives in Principal Cities

**CLIPPER DIAMOND TOOL CO., INC.**

345-C HUDSON ST., NEW YORK 14, N. Y.

For more data circle 605 on Reader Service Card

## KOEPFER GEAR HOBBING MACHINE

A Universal Purpose Machine  
for the economical production  
in either small or large quan-  
tities of Spur Gears and Pin-  
ions, Spiral Gears, Worms as  
well as Worm Wheels.

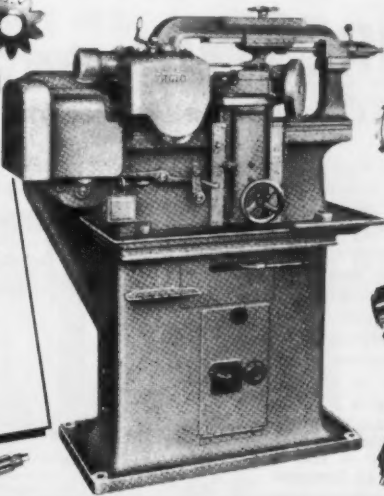
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ILLUSTRATED FOLDER



**GEORGE SCHERR CO., Inc.**

200-MMLAFAYETTE ST. • N. Y. 12, N. Y.

For more data circle 606 on Reader Service Card



COMPLETE LINE OF  
PRECISION INSTRUMENTS

**new shop equipment . . .**

changeable adapter bushings and a centering locator plug. Four way adjustment and simplicity of setup save time on both small lot and production work.

A heavy cast clamp plate is equipped with hardened bushings and is mounted like a die set on two sturdy leader pins, which are accurately positioned in the base. A hand screw provides easy vertical adjustment. Steel surface plate, vee blocks and all mounting surfaces are precision machined and ground to assure accurate positioning. Adapter bushings of 5/16, 1/2 and 3/4 inch o.d. size are provided as inserts for the clamp plate to accommodate ASA standard drill jig bushings of 0.0135 through 0.5625 inch diameter. Vee blocks, 9/16 inch and 1 1/2 inches in vee widths, handle stock

sizes from 1/4 inch through 2 inches outside diameter.

Four way adjustment of vee blocks is controlled by machined tee slots and adjusting screws. Tapped holes are provided at both ends of the jig for attaching stock positioning rods. Slots provided in the base for bolting the jig firmly to the machine table are 5/8 inch in width.

Vee blocks are secured by two socket head cap screws, can be quickly changed, and are easily and accurately adjusted on center with the precision locator plug provided as standard equipment. Adapter bushings are changed by simply loosening a single lock screw and inserting a new size. Thus, with the jig mounted in line with the machine spindle, changeovers in setup from one operation and from one size tool to another, can be made in a matter of seconds.

For more data circle 135 on Reader Service Card

the **ARC-TWIN** *Cuts Two Perfect Notches*  
in **One Downstroke of Press!**

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from 1/2" to 2 3/4" O.D.; special units, up to 3" O.D. Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.



Ask for  
twin-notched  
sample of  
pipe  
or tubing

**VOGEL**

**TOOL AND DIE CORPORATION**

1823 North 32nd Avenue  
Melrose Park, Illinois

For more data circle 607 on Reader Service Card

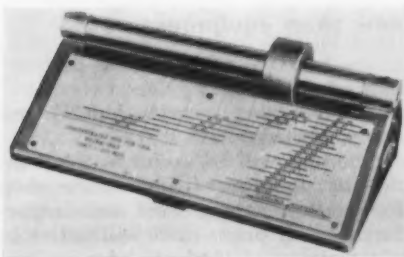
## UNIT DEMONSTRATES FIT BETWEEN SHAFT AND HOLE OF CYLINDRICAL PARTS

Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill., has announced its Limits and Fits Demonstration Unit, which is a device that provides the actual "feel" of a fit between shafts and holes of matching cylindrical parts.

It is of particular value to designers and draftsmen and will assist in avoiding unnecessarily close, uneconomical tolerances.

The unit consists of a tapered bar of approximately 1 inch diameter and a sliding reference ring with a bore of the same taper—providing a parallel clearance between the ring and the shaft.

The scale plate, mounted in front of the bar and protected by a clear plastic cover, is divided vertically to rep-



Engis Limits and Fits Demonstration Unit

resent specified clearances, and horizontally to represent the minimum and maximum clearance for a number of preferred fits in the diameter range.

The complete unit is well finished and the taper bar and sliding datum ring surfaces are hard chrome plated to resist wear. Scales are available for American/Canadian Standards, as well as international standards. All scales can be used without modification and

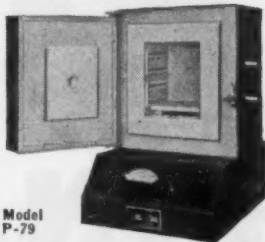
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## PRODUCED AND PRICED RIGHT FOR YOUR ELECTRIC FURNACE NEEDS

### DYNA-TROL

MODEL NO.	FIRING CHAMBER (H.W.D.)	PRICE (300° to 2090°)	PRICE (400° to 2300°)
P46	4½"x4½"x8"	\$90.00	\$110.00
P79	6"x6"x9"	\$205.00	\$225.00
P918	9"x9"x18"	\$480.00	\$528.00
P414	14"x14"x14"	\$525.00	\$603.25
P124	12"x12"x24"	\$715.00	\$822.25
P818	18"x18"x18"	\$775.00	\$887.50
P136	18"x18"x36"	\$1125.00	\$1312.50

Automatic Controls Available on all Models



Model P-79

- Infinite zone temperature control
- Zone temperature indication by Pyrometer Selector Switch
- Automatic hold and cut-off instrument available
- Patented element holders
- Infinite variety of time-temperature curves obtainable
- Rugged construction



Modified Model P136-HAM for atmosphere operation

Over 40 Standard Models Write For Literature

**INDUSTRIAL DIVISION**

**MANUFACTURING CO.**  
Chester 77, Pa.

For more data circle 608 on Reader Service Card

**new shop equipment . . .**

familiar with the technique of applying tolerances to fits.

For more data circle 136 on Reader Service Card

their interchange may be quickly and easily carried out.

The unit will be useful in the engineering department and in the shop for draftsmen, engineers and inspectors. It will prove most instructive in the training of students who are un-

★ ★ ★

### **DRILL PRESS VISE HAS PUSH-PULL ACTION**

A drill press vise, that combines rapid action with unlimited takeup,



**"BEST \$1530 WE  
EVER SPENT!"**

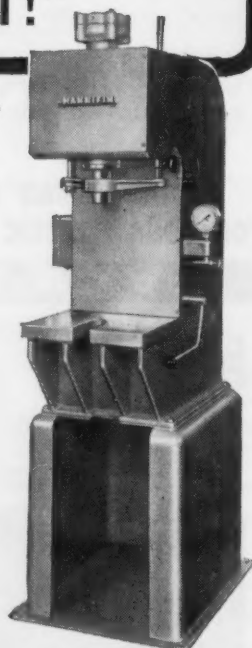
### **That's the price of this 5-Ton HANNIFIN Press\***

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

**WRITE.** Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

\*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



# **HANNIFIN**

**Hannifin Corporation, 565 S. Wolf Road, Des Plaines, Illinois**

For more data circle 609 on Reader Service Card

has been developed by the Wilton Tool Manufacturing Co., Inc., Schiller Park, Ill. Incorporated into the vise is the company's Rapid Titan Nut, which engages and disengages the screw automatically. There are no buttons, no springs and no triggers. The threads are brought into contact with the screw by rotating the vise handle in the tightening direction. The screw is released for free sliding action by

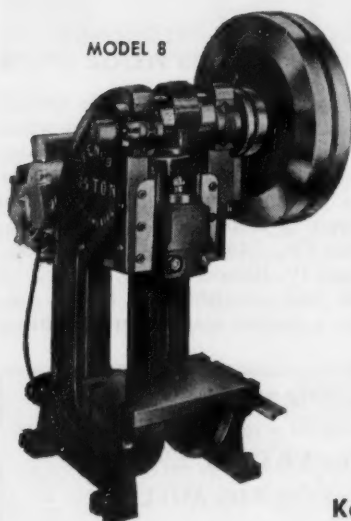
turning the handle counterclockwise. The screw is threaded its full length and diameter. The nut is in a fully enclosed housing and cannot be damaged by impact, over tightening or dirt. There are no moving parts to fail, no sharp edges to cause thread wear and all parts are unconditionally guaranteed for three years. According to machinists who have used it, the drill press vise saves time in setup

★ ★ ★ ★ ★

# KENCO 8-TON

## PRECISION-BUILT

# PUNCH PRESSES



MODEL 8

*... rugged, fast and trouble-free*

They're Kenco-built with long-wearing parts throughout to eliminate downtime and give you many extra years of steady, low-cost production. Rigid, multiple-rib frames and extremely long ram ways assure high precision production. Driving mechanism engineered for trouble-free operation. Press is competitively priced.

*Model 8-R—8-ton  
deep-throat,  
Rigid-Rib*

Same construction features, but with 12¾" throat, and tremendous resistance to breakage, deflection, or torsional twist.



**Kenco presses—14 models—2 to 15 tons**

*Write for literature*

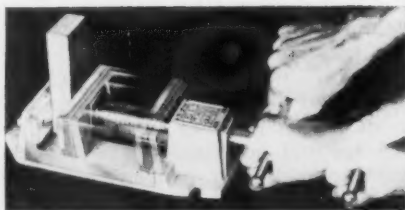
## KENCO MANUFACTURING CO.

5211 Telegraph Road, Los Angeles 22, California

For more data circle 610 on Reader Service Card

## new shop equipment . . .

clamping and is unusually easy to operate. It is estimated that loading and unloading time is cut about 75 percent, and this represents substantial cost reductions on production run jobs. The Wilton Drill Press Vise is  $4\frac{1}{2}$  inches wide, has a solid base and can

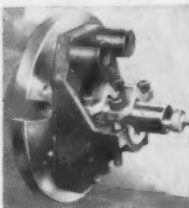


Wilton Drill Press Vise has push-pull action

# LASSY

## WORK HOLDER

Provides quick accurate set-ups on  
Lathes, Grinders, Jig Borers, Milling  
Machines and Drill Presses.



Model R

Shown

\$49.00

Model P-2  
with quick acting  
swing clamp  
is ideal for production

\$67.00

**RUGGED DESIGN, SUSTAINED ACCURACY  
GUARANTEED TO .0005**

HARDENED and STABILIZED

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# LASSY TOOL COMPANY

Plainville, Conn.

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be turned on edge for accurate 90 degree drilling. The ends of the base are cut back, and the sides are machined to form a true right angle with drill press tables. A third advantage is the combination of low overall height and maximum working depth. The vise is only  $2\frac{3}{4}$  inches high, but has a full  $1\frac{3}{4}$  inch jaw depth.

For more data circle 137 on Reader Service Card

★ ★ ★

## VERTICAL HIGH FREQUENCY MACHINE REDUCES FLOOR SPACE

A space saving, 9,600 cycle special vertical motor generator combination control and heating station for pre-heating and diffusing automotive valves during aluminizing operations has been developed by Lindberg Engineering Co., 2469 West Hubbard St., Chicago 12, Illinois.

The unit consists of a motor generator, a control station for regulating



## Monarch Precision SHAPLANE Radius Tools

Illustration shows convex cutter for  $\frac{1}{4}$ " to  $2\frac{1}{2}$ " balls.

## FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range  $\frac{1}{2}$ " to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

PATENT  
PENDING

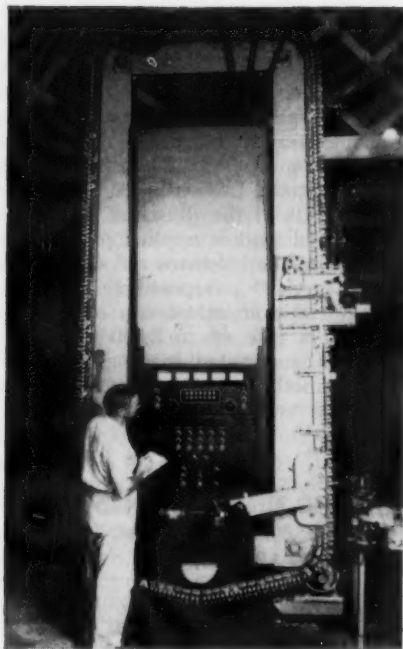
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## C. B. TEETER, TOOL ROOM SPECIALTIES

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Lindberg Vertical High Frequency Machine

and controlling the application of high frequency power and two heating stations, one above the other, to apply high frequency power to the inductors for preheating and diffusing the valves. A vertical conveyor system, wrapped around the 14 foot high cabinet, moves the valves through the various opera-

tions and is loaded and unloaded automatically from the shop overhead conveyor. A metallizing gun with separate control panel sprays the valves with molten aluminum which, in the subsequent heating operation, forms a hard heat resistant iron aluminum alloy to withstand the high temperatures of the new high powered motors.

A supervisory system of "Check-lites" maintains a constant check on

**NIBBLE** *Your* **COSTS**

WITH... **SAVAGE**

**NIBBLING MACHINES**

- TUBE CUTTING
- CIRCLE CUTTING
- STANDARD NIBBLING
- FREE-HAND or  
TEMPLATE CUTTING
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NO SECONDARY OPERATIONS
- SPEED WITH SAFETY  
NO OPEN FLAME OR SPARKS



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in MILD STEEL

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making Dies and  
Templates

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8-oz. can fitted  
with Bakelite cap  
holding soft-hair  
brush for applying right  
at bench; metal surface  
ready for layout in a few min-  
utes. The dark blue background  
makes the scribed lines show up in  
sharp relief, prevents metal glare.  
Increases efficiency and accuracy.

Write for sample on company letterhead

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With DYKEM Steel Blue

Without DYKEM Steel Blue

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**new shop equipment . . .**

air temperature, water temperature, high voltage interlocks, water flow and other operating conditions of both the motor generator and the work stations. Signal lights instantly reveal abnormal conditions occurring at any of the many protective devices.

**JIG BORING**  
and  
**Large Precision Machining**  
Done to your specifications  
**We have 22 Jig Bore**  
**KIDDE PRECISION TOOL CORP.**  
15 LOCUST AVENUE, ROSELAND, N. J.

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**THE HELIOS**  
**50 EK VERNIER**  
**CALIPER**

With Automatic Thumb Lock . . . With all Inch Scales or one Inch and one Metric Scale:

**\$9.90**

The 55 A with set screw lock with one Inch and one Metric scale or all Inch scales:

**\$8.90**

All prices F.O.B. New York

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Dull Chrome finish calipers and Dial Indicator calipers

For details on other imported precision instruments, write

**NEISE MODERN TOOLS** **KARL A. NEISE, Dept. MM5**  
404 Fourth Avenue  
New York 16, N. Y.



For more data circle 616 on Reader Service Card

Spindle type workholding fixtures rotate the valves at approximately 1,000 r.p.m. past the metallizing operation and approximately 100 r.p.m. at the preheat and diffusing stations. Variable ratio transformers reduce the voltage from approximately 800 to 40-80 volts at the preheating inductor to 80-160 volts at the diffusing inductor, where final heat is applied to provide operating temperatures of 500 and 1,500 degrees F., respectively. No flux is required and valves can be aluminized at a rate up to 3,500 per hour with the automated loading and unloading method.

For more data circle 139 on Reader Service Card

★ ★ ★

**CHILLING UNIT DESIGNED  
TO CURE METALS AND  
AVOID WARPAGE**

Cincinnati Sub-Zero Products, 3930 S-7 Reading Rd., Cincinnati 29, Ohio, has introduced a low temperature chilling machine, the Model 3SR 120-47, which was developed to eliminate many of the problems which occur in the conventional heat treatment of stainless steel and to be used extensively for the elimination of retained austenite in the new steels being used in the industry in recent years. Rocket and missile steel, for example, must retain hardness and dimensional stability at elevated temperatures.

**NEW**  
**FLUSH PIN**  
**AMPLIFIER**



**OFFERS 5 to 1**  
**AMPLIFICATION**

- No dial indicator needed • No master required
- Extremely rugged • Speeds up inspection • .001 to .010 tolerance range. WRITE FOR DETAILS.

**HOLMES GAGE & DEVELOPMENT CORP.**  
Columbus 3, Ohio

For more data circle 617 on Reader Service Card

The Model 3SR 120-47 has a 47 cubic foot chamber, which is 126 inches long by 18 inches wide by 36 inches deep. It has a net thermal capacity of approximately 6,000 B.T.U. per hour at minus 120 degrees F. Using convection fluid, it will chill 250 pounds of steel per hour from ambient to minus 120 degrees. For the purposes of faster and more uniform chilling, the chamber is equipped with a Model VH-5, 1/2 h.p. convection fluid agitator. The water cooled refrigeration system has two 5 h.p. condensing units operating on 440 volts, 60 cycle, three phase with 110 volt control circuit.

Outside dimensions of the machine are: height, 48 inches; length, 180 inches; and width, 60 inches. The one piece cabinet is 14 gauge steel with a 7 gauge steel base. A mullion heater, in the cabinet channel cap, prevents condensation of moisture and assures dry cabinet exterior. The chilling chamber, electric welded pressure

tight, is constructed of 7 gauge steel, hot dipped zinc coated to standards of the American Hot Dip Galvanizers Association. Rounded corners promote strength and safety.

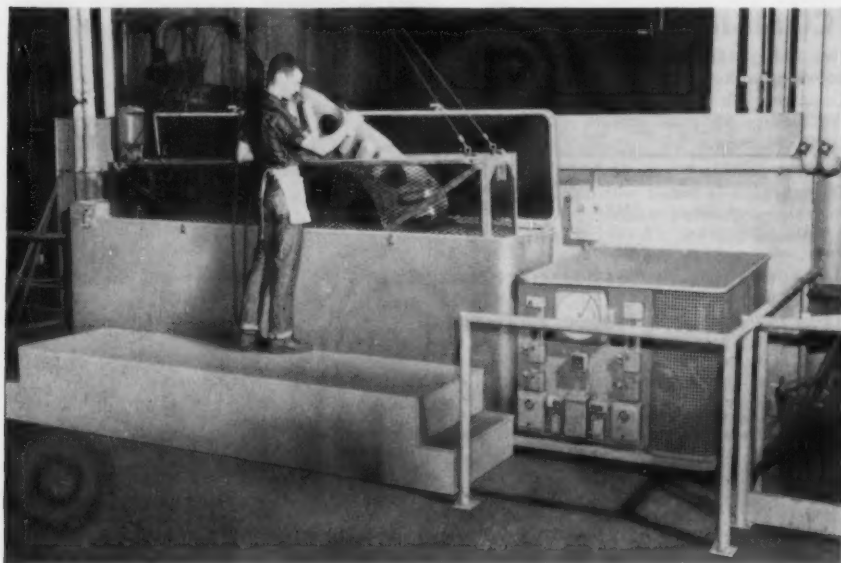
The Model 3SR 120-47 is efficient not only for stainless steel hardening, but is also suited for use in any type of production chilling operation. The built in system of temperature adjustment, and quick pull down from ambient to minus 120 degrees, offer the versatility and speed to meet today's increasing demands.

For more data circle 139 on Reader Service Card

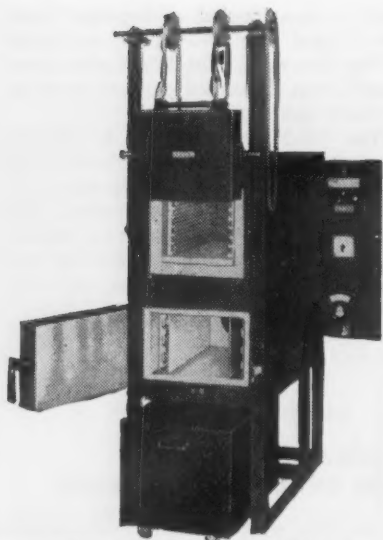
★ ★ ★

### COOLANT APPLICATOR FOR DRILLING OR TAPPING

In the accompanying illustration, attached to a drill press column is one of the Squirt Coolant Applicators which eliminates brushing and frees



Cincinnati Chilling Machine being used to stabilize austenitic stainless steels and tools



## SAVE SPACE WITH A SERIES 8055 COMBINATION MODEL

Two independent furnaces (hardening and drawing) in the same floor space one requires. Complete with independent controls. Hardening furnace available in both a 2000° and a 2300° F. range.

Drawing furnace has a maximum of 800° F.\* Quench tank included with the exception of the largest standard model.

Chamber Size			Prices	
H.	W.	L.	2000° F.	2300° F.
6"	6"	12"	\$ 865.00	\$ 975.00
9"	9"	18"	1325.00	1450.00
12"	12"	24"	1850.00	1950.00
18"	18"	36"	2750.00	2875.00

\* Also available up to 1250° F.

WRITE FOR FREE LITERATURE, SPECIFICATIONS and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

## LUCIFER FURNACES, INC.

NESHAMINY 6, PA.

Phone Diamond 3-0411

For more data circle 618 on Reader Service Card

### new shop equipment . . .

both hands for other applications. This product was recently introduced by Mechanical Appliance Co., Dept. MS, 1111 North Franklin St., Chicago 10, Ill. This applicator dispenses the proper amount of coolant, which is directed to the proper spot when wanted. The assembly consists of a small hydraulic pump inserted in a one quart fluid container, rigidly attached to a screw type metal cover. This cover, in turn, is attached to a fixture that is fastened to the column of the press by a U bolt, which is tightened by two hex nuts.

The application is operated by a lever, which depresses a pump plunger. An actuating rod, attached to the quill of the machine, makes the operation automatic. This unit is said to be efficient in operation and free from maintenance. Neither electricity nor air is required.

For more data circle 140 on Reader Service Card



Squirt Coolant Applicator is shown here being used on a drill press column

## GEAR DEBURRING MACHINE COMBINES WITH POLISHING LATHE

The Morrisflex Semi-Automatic Gear Deburring Machine, Model MA-660, sold by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich., has been designed for use with a polishing lathe and wire brushes to deburr and radius gears, splines and serrated parts. This machine replaces hand deburring and makes it possible for even unskilled workers to produce uniform finishes.

Rotation of the work, constant pressure against the brushes and dwell time are all controlled by the machine. The work head, located at the top of the traversing arm, rotates at 80 r.p.m. and can be adjusted vertically and horizontally. A lead screw, operated by a handwheel, provides lateral adjustment of the traversing arm to center the work between the brushes.

A double acting air pressure system moves the traversing arm from the loading position to the brushes and



Morrisflex Semi-Automatic Gear Deburring Machine for use with polishing lathe

November, 1957

## What is your LUBRICATING PROBLEM?

- ☐ LATHE CENTER LUBRICATION  
SCORING-GALLING
- ☐ GRINDING CENTERS  
LUBRICANT WASHOUT
- ☐ DRAWING  
SCORE MARKS-DIE WEAR
- ☐ STEADY RESTS  
WORK PIECE DAMAGE
- ☐ PRESS FITS  
SCORING-SEIZING
- ☐ DIE POSTS  
WEAR-FREEZING



CMD Lube has solved many like it with excellent results. Perhaps CMD will be your answer, too!

**CHECK AND  
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SAMPLE**

*Anti-Scoring Lubricant*  
**CHICAGO MANUFACTURING  
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modern machine shop 333



MARK OF  
QUALITY

## STANDARD STEEL SPECIALTIES

- **MACHINE KEYS**  
We can supply a complete line of finished machine keys including gib head and taper keys, rod keys, round end keys, etc.
- **WOODRUFF KEYS**  
Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.
- **TAPER PINS**  
Available in sizes 7/10 through 10 and lengths from 3/4 inch to 6 inches. Others made to specifications.
- **MACHINE RACK**  
Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

WRITE FOR CATALOG

**STANDARD STEEL SPECIALTY CO.**  
BEAVER FALLS • PENNSYLVANIA  
Plants: Beaver Falls, Pa.; Hammond, Ind.

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## RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Silliman Ave. Bridgeport 5, Conn.

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**new shop equipment . . .**

presents the work to the brushes at the correct pressure. After correct dwell time, the preset timer switch shuts off the machine and the air system withdraws the work from the brushes to complete the cycle.

The preset timer switch is the heart of the automatic cycle. Once correct dwell time is established and set on the dial switch, the operator is required only to load, unload and push the switch button for automatic processing of the work. The Model MA-660 is available for right or left hand sides of a lathe.

For more data circle 141 on Reader Service Card

★ ★ ★

**GAGING BLOCK**

A self-mastering adaptation to many checking applications, plus new features of efficiency and economy, have been built into a 6 inch gaging block, which has six vee way locations at 1 inch increments for rigidly mounting instrument arms with identical vee angle, thus effecting solid instrument rigidity and accurate repetitive locating. This gaging block is available from V-Way Gaging Co., 81 Delawanna Ave., Clifton, New Jersey.

One adaptation is a self-mastering variable indicator checking gage, accomplished in conjunction with the instrument-scriber vee arm, the scriber of which is utilized for mounting dial or toolmakers indicator, (also a facility for checking the accuracy of the indicator) and the height gage type base, which is a surface plate with four selective positions for mounting gaging blocks in dual or single column and is being used in this application as a comparator base.

The gaging block column may be reversed, with arm extending outward



in height gage manner 0 inch at the base for extremely accurate layout or indicator checking. The scribe square may be instantly dropped away for direct reading by micrometer contact.

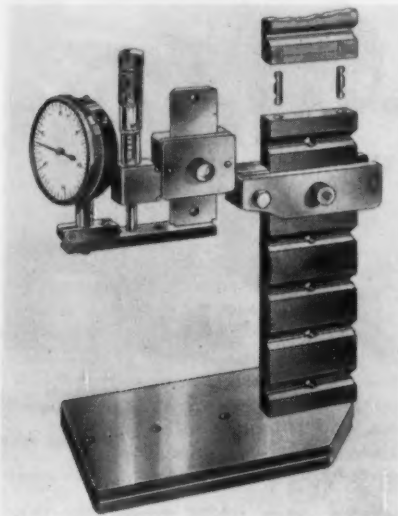
Desired height or length is quickly attained by the number of gaging blocks used, rigidly interlocked by rigid joint locating pins.

Functional points of the stabilized gaging block are wear free; accuracy is constant; overall dimension is of gage block accuracy, plus or minus 0.000008 inch; the 1 inch increment vee ways are equidistant to plus or minus 0.00005 inch which is contained within the gaging block, eliminating accumulated error when using more than one block.

The addition of an anvil arm provides for a variable hand checking tool of different varieties from 0 inch to the extent of the gaging blocks used.

The components of an 18 inch unit can be carried or stored in a small package.

For more data circle 142 on Reader Service Card



View showing V-Way 6 Inch Gaging Block



For This Production Boosting

## "TRICO-MIST" COOLANT SYSTEM

With Flexible Armored Coolant Lines  
And Kwik-Change Nozzle.



For drilling, tapping, milling, sawing, grinding, etc. Removes heat from cutting edges of tools and work. Feeds can be increased considerably, finer finishes and accuracy are obtained. TRICO-MIST absorbs heat, thereby quenching it faster than flood coolants which only transfer it. Chips slide freely up the tool face and are blown away automatically. Simple needle valve controls size and volume of mist spray. Attaches to shop air line. Available with one and five gallon containers — single or multiple outlets — single or dual valve control.

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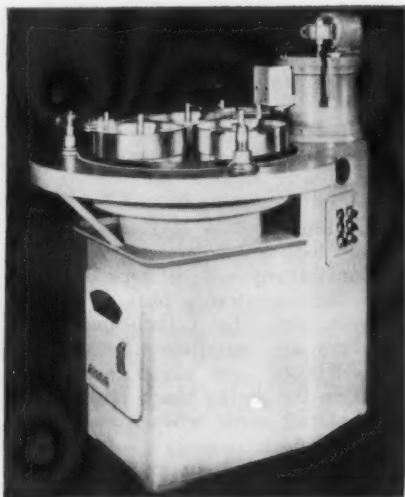
**TRICO FUSE MFG. CO.**  
MILWAUKEE, WIS. U.S.A.

For more data circle 622 on Reader Service Card  
modern machine shop 335

new shop equipment . . .

**LAPPING MACHINE COUPLES  
PUSHBUTTON OPERATION WITH  
FRICTIONAL DRIVE**

The Gyro-Matic 24 Lapping Machine, which combines automatic push-button operation with frictional drive work retainer rings, is now available from Spitfire Tool and Machine Co., 2931 North Pulaski Rd., Chicago 41, Ill. Including a 24 inch diameter anti-distortion lapping plate, the Gyro-Matic has been designed for production line precision lapping and finishing of all types of flat parts. Each of three workholder rings accommodates piece parts up to  $9\frac{3}{4}$  inches in diameter. The Gyro-Matic 24 incorporates double duty frictional drive parts retainer rings. These rings both retain and guide the work while conditioning the lapping plate during the cycle.



Spitfire Gyro-Matic 24 Flat Lapping Machine

In order to eliminate the possibility of grit build-up around the abrasive

# ECONOMY

*"A Name To Remember"*

— whenever your duplication requirements call for the standard tool items illustrated here. Stocks at **ECONOMY** are always complete — assuring you of quality and service.

*Descriptive Bulletins, Prices, and Dimensional Data Sheet No. 7-A upon request. Ask for prices on salvaging worn-out plug and ring gages.*



**ECONOMY TOOL & MACHINE CO.** 1827 South 68th Street  
Milwaukee 14, Wisconsin

For more data circle 623 on Reader Service Card

control outlet, an aperture metering disc has been incorporated into the design of this machine. Depending upon the individual lapping or finishing job at hand, an operator adjusts the metering disc to the outlet size required and a steady stream of abrasive compound flows through, thereby eliminating the need of cracking a metering valve and causing grit build-up. Coupled with the abrasive agitator paddle, the manufacturer claims that abrasive suspension is correct 100 percent of the time.

In a further effort to cut down time and attain maximum lapping efficiency, the Gyro-Matic 24 has been constructed with a circular work area. When the lapping operation has been completed, piece parts are merely slid from the lapping surface directly to the circular work area. Quantity unloading takes only seconds. Another work and timesaver is that the com-

plete abrasive tank unit is removable with the loosening of three screws.

For more data circle 143 on Reader Service Card

★ ★ ★

## MULTIPLE SPINDLE DRILL HEAD IS CHAIN DRIVEN

A multiple spindle drill head, which transmits driving power to the drills from the head of a standard drill press with chains and sprockets, is now available from Nicholson-Berger Co., Inc., 17755 Dora St., Melvindale, Mich. This unit, which can also be used for tapping, is claimed to require less horsepower than geared units and to reduce from 30 to 50 percent the vertical space needed.

In many cases when a drill press is equipped with a multiple spindle unit it is necessary, because of the extra head room required, to dig a pit to accommodate the extra height. How-

★ ★ ★ ★ ★

## "MULTI-INSULATION"

Is the secret of . . .

## HUPPERT

### Floor Model Furnaces

These sturdy production type Huppert electric furnaces not only attain highest efficiency, but also cut operating costs to a minimum through the unique Huppert method of using multi-insulation surrounding all sides of the heating chamber. Heat range—continuous up to 1850° F.,

intermittent operation to 1950° F., can also be built for 2300° F. operation.

This furnace comes complete with an indicating electronic temperature controller, and a tight sealing, wedge-type door is used. Standardly furnished for 220 V. AC single or 3 phase operation. (110 V. or 440 V. models to order).

This model built in 20 different sizes.

Model No. 16 illustrated—12"x8"x18"—\$1050.00 complete

Write for literature on complete line of Huppert furnaces and ovens.

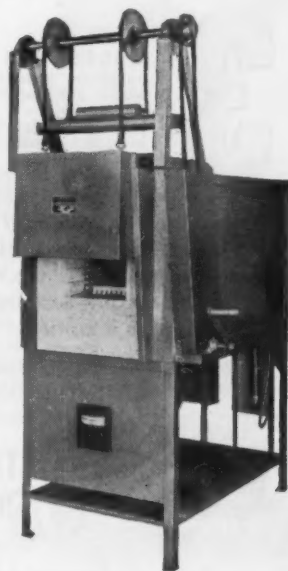
## K. H. HUPPERT CO.

6841 Cottage Grove Avenue

Chicago 37, Illinois

Manufacturers of Electric Furnaces and Ovens

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**A FEW PIECES**  
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**NO DIES!** Our machine cut method, applying custom-built slitters, cutters, saws, files and stock punches—PLUS special techniques and skills—produce these small quantities at very low cost.

# 2

**SHORT RUNS**

**TEMPORARY LOW-COST TOOLING!** To produce something more than a few, but less than high production quantities, our simple contour dies—PLUS special purpose presses—keep costs low.

# 3

**HIGH RUNS**

**MODEST DIE CHARGES** on larger quantities! Here is where our regular production tooling applies to advantage... to deliver high quantity Stampings, and at lowest possible unit cost.

You can rely on it...we look at all 3 Stamping techniques, each our exclusive development...to determine the best method for fast, efficient, low-cost Service on any quantity—one to a million!

*Free 12-page booklet shows how to save on stampings...write for it.*



**STAMPINGS  
DIVISION**

3311 Union Street, Glenbrook, Conn.

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338 modern machine shop

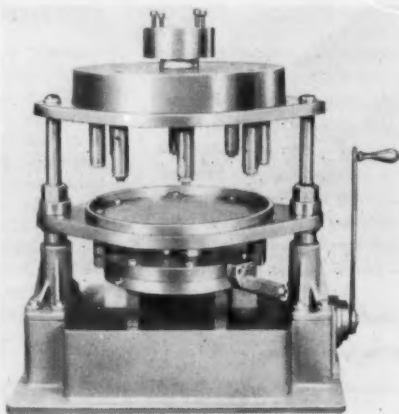
## new shop equipment . . .

ever, this Nicholson-Berger Unit eliminates this problem and, therefore, the machine can be moved from one plant location to another location without any difficulty.

Another advantage of the NBC chain drive is the flexibility of drills that can be driven. The chain drive is said to offer an almost unlimited variety of shapes and lengths, and the ratio of spindle speeds can be changed by using sprockets of varying sizes. No idlers are required.

Each unit is designed to the specifications of the customer's work part prints. In many instances the unit can be built to do more than one production drilling operation. Fixtures are designed and built with the drill head unit to provide the customer with a complete unit ready for installation and immediate production.

The NBC Unit, using cast aluminum where steel boiler plate or heavy castings are usually used, is very light in weight and strength and rugged construction are said to be increased.



Nicholson-Berger Chain Driven Drill Head

November, 1957

The eight spindle unit shown in the accompanying illustration is light enough for one man to handle and was designed to drill 16 holes and counterbore eight holes in a flywheel. The table indexes every 90 degrees and, because drills of different sizes are used, some spindles operate at faster speeds. Four spindles use step drills for the drilling and counterboring operation.

For more data circle 144 on Reader Service Card

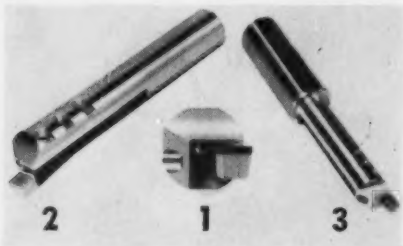
★ ★ ★

### BORING BAR

A boring bar has been designed by the Buck Tool Co., 1014 Schippers Lane, Kalamazoo, Mich., to provide greater rigidity for heavier, faster cuts—with standard and carbide tipped cutters—and to handle boring and counterboring with one tool.

The accompanying illustration shows three views of the Buck Boring Bar. (1) Front view shows how cutter overhang is minimized to increase strength and rigidity. (2) Side view illustrates how the full shank of the cutter is held firmly by three locking screws. (3) Shows screw at end that adjusts cutter for close tolerance work.

The manufacturer states that putting the cutter "out front" provides ample chip clearance and permits using a bigger shank bar for greater strength and rigidity. Standard cutters



Three views of the Buck Boring Bar

## STUBBORN

*broken pipes  
studs and screws  
easily removed*

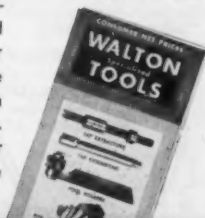
**WITH REPS PIPE &  
STUD EXTRACTORS**  
MAKES STRONG FOUR POINT  
GRIP WITHOUT HAMMERING

A specialized tool that creates a powerful pulling bite without reaming. Hardened steel—will remove any material.



In sizes for every pipe  $\frac{1}{8}$ " to 2", every stud and screw  $\frac{3}{16}$ " to  $\frac{3}{2}$ ".

Take advantage of Walton's 30-day free trial to investigate the labor savings that this simple specialized tool can effect in your shop. Write for Data Folder #10 giving complete details.



**The WALTON Company**  
**HARTFORD 10, CONN.**

For more data circle 626 on Reader Service Card

## small, lightweight air hoist gives you greater VERSATILITY

**Ingersoll-Rand**

**AIR-BLOC**

combines  
safety,  
ruggedness  
and mobility...

The I-R AIR-BLOC gives you versatility you never thought possible for speedy handling of loads up to 1000 pounds. No mechanical brake to fail... load can't drop even if air pressure fails. Responsive throttle control and automatic up-down-stop permit extremely accurate handling. There's a size just right for your job.

Portable winch-type Utility Hoists, in a wide range of sizes up to 4000 lbs., are also available from Ingersoll-Rand.

### PENDENT THROTTLE

The only complete line of air hoists with convenient "one-hand" control.

- Speedspotting of loads.
- Provides "Finger-tip" control over full range of speeds.



8-529-1

For more data circle 627 on Reader Service Card

340 modern machine shop

## new shop equipment...

can be used. Since cutting edges are always on center, tip grinding is minimized. The adjusting screw provides adjustment to tolerances as precise as machine spindles permit — even on 1 inch boring bars.

There are 30 sizes of Buck Boring Bars ranging from maximum-minimum capacities of 1-1/32 to 25/32 inch up to 6 1/4 to 5-1/32 inches.

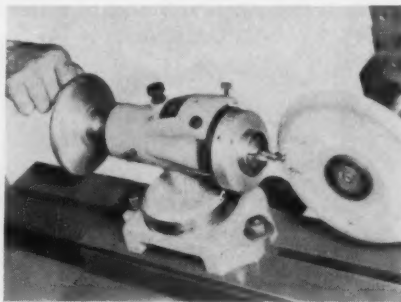
For more data circle 145 on Reader Service Card

★ ★ ★

## VERSATILE RELIEF GRINDING ATTACHMENT

Steptool Grinding and Manufacturing Co., 3613 East Olympic Blvd., Los Angeles 23, Calif., has introduced its relief grinding attachment, which is said to perform 90 percent of all grinding jobs confronting shop operators and tool grinding departments which would ordinarily require a complex fixture.

This fixture quickly sharpens such basic tools as taps, countersinks and step drills because of its simple infinitely adjustable cam with constant rise and its rapid change to different numbers of flutes, right or left hand.



Steptool Relief Grinding Attachment

November, 1957



One rapid rotation of the spindle sharpens the tool.

The attachment can be motorized for mass quantity production. It can also perform cylindrical, index and flute grinding. It uses 5-C or Ericson collets and specially designed collets for step drills.

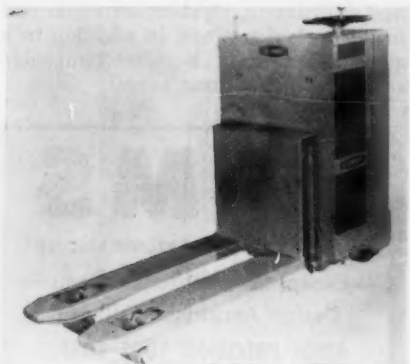
For more data circle 146 on Reader Service Card

★ ★ ★

### 4,000 POUND CAPACITY PALLET TRUCK

An improved model of its rider type low lift pallet truck has been announced by The Raymond Corp., 88-155 Madison Ave., Greene, N. Y. The changes incorporated in the 4,000 pound capacity unit include redesigned reach rods beneath the elevating forks, specially tapered fork tip for easy pallet entry and additional grease fittings for fast and easy maintenance of all lever assemblies.

Features of the earlier model, which allow the truck to right angle stack 48 inch pallets from a six foot wide aisle, have been retained. The truck has three travel speeds in forward and reverse with a maximum of 4½ m.p.h. For more data circle 147 on Reader Service Card



Raymond Rider Type Low Lift Pallet Truck

*If your product  
requires  
threaded  
fasteners...*



Ingersoll-Rand

**ASSEMBLY  
MACHINES**

*can help you  
save time,  
money and  
improve  
product quality*



... any size bolt or  
screw!  
... hand held or  
automatic!  
... maintains desired  
torque!  
... as many spindles  
as you want!

Contact an  
Ingersoll-Rand  
A/R engineer now. He's  
your link with a world  
leader in automatic  
assembly machines.



8 521-1

**Ingersoll-Rand**

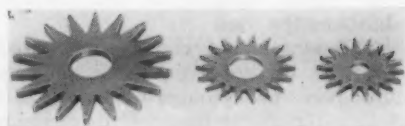
11 Broadway, New York 4, N.Y.

For more data circle 628 on Reader Service Card

**new shop equipment . . .**

**INDUSTRIAL CUTTERS PROVIDE  
LONG LIFE AND FAST DRESSING**

Available from Machine Products Corp., 125 Hollier St., Dayton 3, Ohio, Johnston Milled, Huntington Style Cutters are made to give unusual wear and long life. These cutters are milled,



*Johnston Milled, Huntington Style Cutters*

not punched, of extra high carbon alloy steel. Heavy, wide cutter teeth provide more steel in each tooth, resulting in extra life plus steel that is hardened all the way through each cutter section.

Johnston milled cutters are available in Number 0 to 1 1/4 inch diameter, Number 1 to 1 1/2 inch diameter and Number 2 to 2 3/8 inch diameter. They have been engineered to fit all makes of Huntington type dressers.

When used with the company's Johnston-Huntington Dresser, it is claimed that these milled cutters provide accurate control and constant, consistent quality.

For more data circle 148 on Reader Service Card

**DRILL THESE HOLES**  
BY A QUICK, EASY, INEXPENSIVE METHOD  
Your business letterhead will bring literature.  
**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

For more data circle 629 on Reader Service Card

**No. 95 HYDRAULIC  
PUNCH**



Capacity: 12 1/2 ton. 20 strokes per minute, 5/8" hole thru 1/4" — 7/8" hole thru 3/16" and 2" hole thru 1/8" iron. 10" depth of throat. Floor space 14 1/2" x 25"—weight 450 lbs. Tool operated by foot treadle from the front. Operator has complete control over descent of punch. Punch unit can be placed above, below, or at either side. Standard 1 1/2 H.P.—1750 RPM Motor. Available in 110-220 volt single phase or 220-440 volt thru phase. Also made in an enclosed cabinet model and known as No. 95A. Write for catalogue.

**W. A. WHITNEY MFG. CO.**  
640 RACE STREET ROCKFORD, ILL.

For more data circle 630 on Reader Service Card

★ ★ ★

**HEAVY DUTY DIVIDER**

A heavy duty 9 inch divider, recently introduced by The L. S. Starrett Co., Dept. MD, Athol, Mass., features fine adjustment, rigid construction and firmly locked settings, in addition to a steel point that is interchangeable with a standard long pencil.

**CAMS**

**MADE TO YOUR SPECIFICATIONS**

—Except Screw Machine Cams—

**Design Assistance Offered**

**KIDDE PRECISION TOOL CORP.**

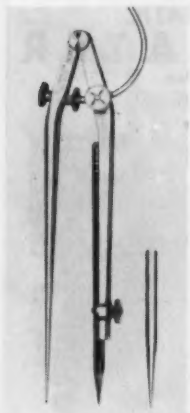
15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 631 on Reader Service Card

Sturdily constructed of tempered and highly polished forged steel for rigidity, light weight and easy handling, the tool has been designed to eliminate wandering when scribing coarse grained wood or rough surfaced metal. A quadrant, projecting through the legs and locked by a knurled clamp screw, eliminates side deflections. A check nut, spring and quadrant adjusting nut permit fine adjustments for close measurements. Tightening the check nut prevents the legs from moving in or out from the established setting.

Also available in the No. 92 Series are dividers of similar design in 6, 7 and 8 inch sizes.

For more data circle 149 on Reader Service Card



Starrett No. 92 Series 9 Inch Divider can be used with steel scribing point or standard long pencil

## LATHE ATTACHMENT

Turchan Follower Machine Co., P. O. Box 6055, Dearborn 9, Mich., has designed a Tracematic Lathe Attachment for reproducing square or tapered shoulders radii, grinding necks, thread runout grooves, tapers, contours and tapered o.d. and i.d. forms. The Tracematic duplicates while making a complete and uninterrupted pass over the workpiece. The full lathe

*New* **IDEAL** **GOLD BAND**

# LIVE CENTERS

GUARANTEED TO MATCH ACCURACY AND CAPACITY OF YOUR LATHES

In the GOLD BAND line Ideal has combined the latest production methods with their traditionally fine craftsmanship to bring you an unequalled standard of excellence in live centers. Accurate, (to  $\pm .0001$ ") GOLD BAND Live Centers offer "custom" quality at production prices. Specify GOLD BAND Live Centers and your every need can be accommodated from stock . . . 99 times out of 100.

Ideal's GOLD BAND Live Centers offer savings, simplified operations and higher lathe output both in quantity and quality. Contact your distributor today!



**IDEAL INDUSTRIES, Inc.**  
1031-K Park Ave.  
Sycamore, Illinois

For more data circle 632 on Reader Service Card

A COMPLETE LINE FOR EVERY  
NEED—SPECIALS TOO!



*Write for*  
Complete catalog data  
and specifications.

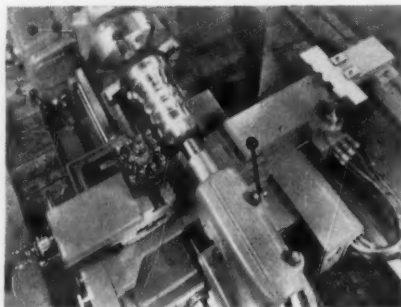
## new shop equipment . . .

swing distance is retained. Opposing shoulders, 90 degree shoulders and intricate boring operations are accomplished without using additional slides.

The Tracematic incorporates high precision tracer and pilot operated governor valves to coordinate the longitudinal feed with the cross feed to permit machining intricate forms, utilizing only the cylinder actuated cross slide and fluid motor driven longitudinal feed.

When the tracing operation is started, the longitudinal feed causes the carriage to move toward the headstock or toward the tailstock, the direction being predetermined by the operator.

With a straight in and out motion, the cylinder operated cross slide causes the tool to duplicate the exact shape of the model into the workpiece.



**Turchan Tracematic Lathe Attachment**

As tapers or shoulders are encountered, the Tracematic slows down or stops the longitudinal motion to permit the tracer controlled cross slide to enter and retract the tool from the work and, thus, accurately reproduce the model or template shapes into the work.

Front mounted for easy access, the



**Specifications**  
 Table Movement:  
 6" x 10"  
 Table Size:  
 7" x 17 1/2"

### Handle your small part precision **JIG BORING** on the **LINLEY** **JIG BORER**

Why tie up your big, costly jig borers on small work when you can get maximum utility at less cost per hour on a machine exactly fitted to your work. Put your small work on the LINLEY where it belongs and reserve your large machines for large work, where large work belongs. You'll save money this way.

Complete details sent promptly on request

**LINLEY BROTHERS CO.**

661 State St. Ext.,  
 BRIDGEPORT 1, CONN.

## MORRISON 1" AUTOMATIC KEYSEATER

Investigate the many features of this new Keyseater. It has automatic feed, automatic stop to cut off feed at given depth, automatic relief to back the work away from the cutter, automatic centering, automatic lubrication and no bushings required.

Write for more information on the finest Keyseater on the market.



**THE D. C. MORRISON CO.**

P. O. BOX 1017B • CINCINNATI 1, OHIO

For more data circle 633 on Reader Service Card

344 modern machine shop

For more data circle 634 on Reader Service Card

November, 1957

unit includes two valves, manifold mounted, for control of the longitudinal feed rate and the cross slide feed rate.

Protection against machine damage is provided by means of an automatic clutch, located in the fluid motor, which disengages the fluid drive when either the lead screw or feed rod is engaged.

Protection against damage to the workpiece is provided through the inclusion of a manually operated positive lock which permits the operator to retract and hold the tool from the workpiece.

Another feature is the retention of all mechanical lathe controls, permitting standard lathe operation when desired.

Adaptable to all makes and sizes of lathes, the Tracematic scope includes small shop work and large boring and axle and roll turning.

For more data circle 150 on Reader Service Card

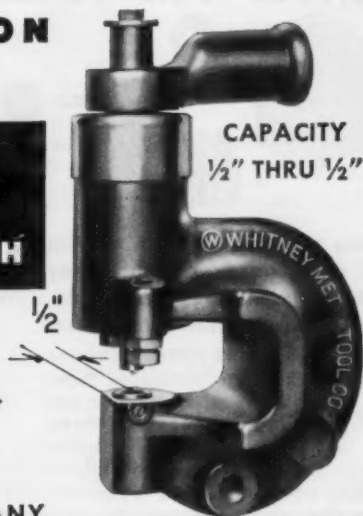
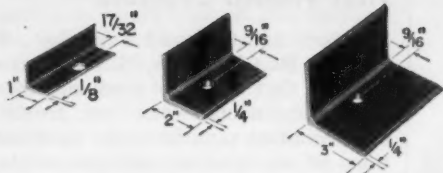
## NEW FEATURES ADDED TO MAGNETIC BASE TOOLS

Important design changes in its Magnetic Base Indicator Holders have been announced by Enco Manufacturing Co., 4520 West Fullerton Ave., Dept. 187, Chicago 39, Ill. The larger models, Nos. 160 and 150 (shown in the accompanying illustration), are now equipped with a lever operated cam to facilitate removal or relocation of the indicator holder base, the magnets of which exert a 125 pound pull. An easy quarter turn on the sturdy lever lifts the magnetic base away from any metal surface on which the device is used, permitting it to be moved about freely. The lever is located well away from the indicator post and will not jam or foul against the base.

When in normal position, the cam release retracts flush with the bottom of the base to permit full contact of the magnets; pole pieces of which are

## PUNCH ANGLE IRON CLOSE TO WEB

**WHITNEY-JENSEN  
No. CTW 20  
BALL BEARING PUNCH**



**WHITNEY METAL TOOL COMPANY  
720 Forbes St., Rockford, Ill. Since 1910**

Write for **NEW CATALOG**

For more data circle 635 on Reader Service Card

**WALLS TU-WAY  
BELT SANDER**

USE IT  
EITHER WAY

Full  
1/3 h.p.  
G. E. Motor



**HORIZONTAL**

**VERTICAL**

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. **\$89.95**

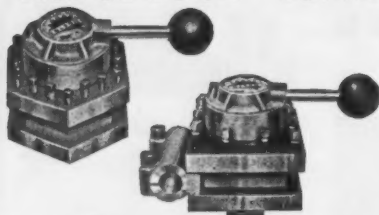
complete with cord, plug, switch ready to use

Illustrated Literature on Request

A few desirable distributor territories still available.

**WALLS SALES CORPORATION**  
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 636 on Reader Service Card

**"WEDGE-LOCK" TURRET**

Does not raise up when indexing in all 12 positions. 4-way and 6-way block models. Repetitive accuracy to within .0003 plus or minus within itself.

**WRITE FOR FOLDER**

Makers of Combination Rotary Tables and Angle Plates. Also Helical Gear Speed Reducers, Single and Double Reduction. Also Special Gears of All Types.

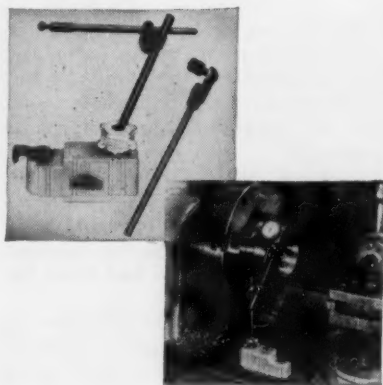
Open territory available to representatives.

**OLSON INDUSTRIAL PRODUCTS, INC.**

49 W. WATER ST. • WAKEFIELD, MASS.

For more data circle 637 on Reader Service Card

346 modern machine shop

**new shop equipment . . .**

Enco Magnetic Base Indicator Holders

ground for positive contact either on flat surfaces or rounds down to a  $\frac{3}{4}$  inch diameter.

A second, equally important improvement is the use of a spoked adjusting nut to replace the round knurled nut which locks the stem in position. The four metal spokes, in addition to the knurled edge, provide a positive grip that makes it easy to release the adjustment, and provides security when locked into position.

For more data circle 151 on Reader Service Card

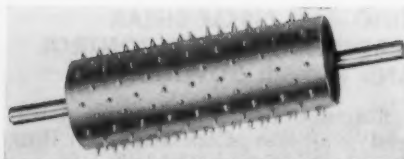
★ ★ ★

**STEEL PINNED CYLINDER**

Robert A. Main and Sons, Inc., 28 Pascack Rd., Paramus, N. J., has announced that it is now producing steel pinned cylinders with heat treated, steel, pointed pins in many combinations of pin spacings and pin angles. These steel cylinders are for use in many types of perforating, punching, tearing and picking operations. These cylinders can be designed so that they

November, 1957





Robert A. Main Steel Pinned Cylinder

can be repinned, if necessary. Also, they can be made for all types of temperature and wet conditions. Spike rolls can be made in any combination of diameters up to 30 inches and in lengths up to 22 feet.

For more data circle 152 on Reader Service Card

★ ★ ★

## COOLANT GENERATOR

Wesco Tool and Manufacturing Co., 2820 San Fernando Blvd., Burbank, Calif., recently introduced its Tool Mist Coolant Generator. The main purposes for using a Wesco Tool Mist Unit are to keep the cutting tool cool during operation, to increase the cutting life and to speed up production.

This unit is recommended for use on drill presses, lathes, grinders, saws, abrasive belts, milling machines and almost any other type of machine that requires a coolant.

Using a Wesco Tool Mist Unit is claimed to reduce the friction and heat from a specific job by keeping the tools cool by mist coolant.

The Wesco Mist process makes it possible to apply coolant in combination with air in such a way that the coolant actually dissipates in the air; no coolant pan is necessary.

The Tool Mist Unit may be purchased in one gallon containers and also in containers as large as 3½ gallons and operates with as many nozzles as required, up to four.

This unit can be used with oil, soluble oil, and so on. The unit works at

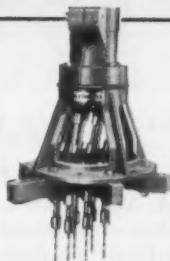
Only

## THRIFTMASTER Universal Joint Type DRILL HEADS

have these exclusive\* features

\*Standard Full Ball Bearing Construction, Including Spindles

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.



\*Standard Slip-On and Slip-Off Template Construction

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.



3 Standard Models . . .

Models U-608 and U-1000—Ball Bearing

Models U-620B and U-1012B—Plain Bearing,  
1½" or ½" min. centers

Models U-608-B5 and U-1000-B5—Ball Bearing  
Gear Case, Plain Spindles

Semi-Standard Heavy Duty Full Ball Bearing . . .

½" in Cast Iron—1⅞" min. centers  
7⅞" or 9¾" Dia.

½" in Steel—1⅞" min. centers  
7" or 9¾" Dia.

Also Larger Adaptations and Full Line of  
Fixed Center Drill Heads.

WRITE FOR FULL INFORMATION



Subsidiary of  
Thomson Industries, Inc.

1034 N. PLUM STREET  
LANCASTER, PA.

Also Makers of

DORMAN AUTOMATIC REVERSE TAPPERS

For more data circle 638 on Reader Service Card

## new shop equipment . . .



Wesco Tool Mist Coolant Generator

a low pressure and no pressure in the tank. Wesco Tool Mist is also made with a compressor for shops that do not have this equipment.

For more data circle 153 on Reader Service Card



- Wedge-brig design for deep, clear impressions
- Quick type-change feature

Outfits include from 80 to 154 pieces of type—plus a holder made from non-spalling, non-mushrooming Mecco Safety steel. Write for Bulletin UT.

**Mecco**  
**SAFETY UTILITY MARKING OUTFIT**  
 A product of the Marking Device Industry  
**M. E. CUNNINGHAM CO.**  
 1051 CHATEAU STREET, PITTSBURGH 33, PA.

For more data circle 639 on Reader Service Card

## RING AND CIRCLE SHEAR FEATURES FINGERTIP CONTROL AND POWER DOWNFEED

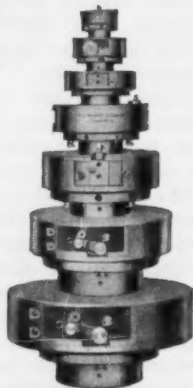
Fingertip control and power downfeed bring ease of operation to a Ring and Circle Shear (Model 33 RC), recently introduced by Niagara Machine and Tool Works, Buffalo 11, N. Y. Developed to make quick, easy work of cutting commercially perfect circles, circular holes and rings, the machine has a capacity of  $\frac{1}{4}$  inch in mild steel.

Conveniently located pushbuttons simplify cutter and downfeed operation. Difficult hand feeding of cutters into the plate is eliminated. Designed to raise and lower the upper cutter easily and quickly, the power downfeed drives the upper cutter down into the material automatically as the cut progresses. Cutter descent can be stopped at any depth, and overtravel of the cutter in either direction is prevented by limit switches. This arrange-

## MUMMERT-DIXON FACINGHEADS

Two-way tool feed  
 in 9, 12, 16, 20, 24,  
 30, 36, 40 and 46  
 sizes.

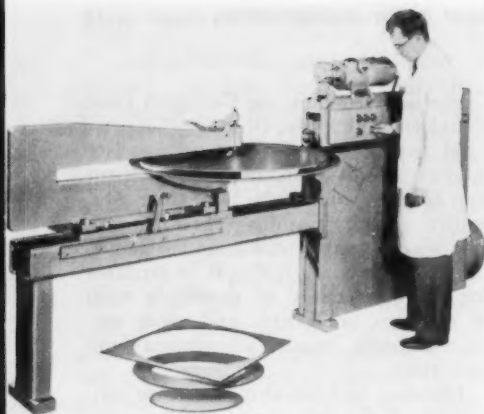
One-way tool feed  
 in 6, 9 and 12 sizes.  
 Automatic feed —  
 convenient tool ad-  
 justment — quick  
 feed reverse. Save  
 time and costly set-  
 ups.



Write for  
 folder.

**MUMMERT-DIXON CO.**  
 120 PHILADELPHIA ST. • HANOVER, PA.

For more data circle 640 on Reader Service Card



Niagara Ring and Circle Shearing Machine

ment permits cutting to be started at any point within, or from, the edge of the blank.

Built in motor controls are neatly housed and protected in the sturdy,

steel plate frame, with nothing protruding to mar the trim, clean cut styling. Other features include a self-compensating circle arm which floats on guided ways to maintain true center automatically, despite varying thicknesses and types of materials; an adjusting crank to enable quick positioning of the circle arm for cutting circles of various diameters; an adjusting swing gage; and high carbon, high chrome cutters for clean cuts at high speed and maximum service between grinds.

For more data circle 154 on Reader Service Card

★ ★ ★

### TRAMRAIL CARRIER WITH DUMPING HOIST

A cab controlled twin hook hoist carrier with an auxiliary hoist for dumping has been built by the Cleveland Tramrail Division, The Cleveland

★ ★ ★ ★ ★



*All Boring can be . . .*

# CHATTER FREE

*if you use* **FRY-VI-BRA-DAMP** Boring Bars.

Fry-Vi-Bra-Damp Boring Bars have definitely eliminated chatter and vibration on jobs where it previously had seemed an impossibility. Bored holes are produced smoother, straighter, and deeper than with conventional boring equipment. Ordinary production boring operations can be performed at increased speeds with better finish and at lower costs.

The Bars are the results of scientific re-

search and design together with practical development. The use of proper alloy steels, correctly machined and properly heat treated and with built-in vibration dampener assures trouble free operation.

The Bars are available in a large range of sizes for all types of Boring Machines. Styles available with removable Dial Micrometer adjustment.

Exclusive representation available in some localities

**FRY TOOL MFG. CO.**

Eaton, Ohio

For more data circle 641 on Reader Service Card



## .0003 HOLE LOCATION IN 1 MINUTE

**EDGE FINDERS**  
**\$2.50** POSTPAID **\$10.00**  
 NEW except C.O.D. DELUXE



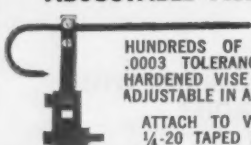
- THOUSANDS HAVE PROVEN and ACCEPTED THE DELUXE MODEL FOR YEARS.
- JUMPS SIDEWAYS AS SHOWN WHEN LOCATION IS REACHED

- ← NEW .500 DIA. MODEL FOR LARGER WORK ONLY. .200

DIA.



### ADJUSTABLE VISE STOP



**\$2.95**

HUNDREDS OF PIECES TO A .0003 TOLERANCE WITH THIS HARDENED VISE STOP THAT IS ADJUSTABLE IN ALL DIRECTIONS.

ATTACH TO VISE WITH ONE 1/4-20 TAPED HOLE.

Dealer Inquiries Invited

**GLOVER MFG. CO.**

422 Park Ave.

Meadville, Penna.

For more data circle 642 on Reader Service Card

**KEO**

## COMBINED DRILLS



## and COUNTERSINKS

- Both old and new series carried in stock for immediate delivery. Finest high speed steel. Ground spiral flutes. New standard simplifies and improves size progression. New comparison chart mailed on request. Shows new standard sizes—both plain and bell type. Specials to your blue prints.

**KEO CUTTERS, INC.**

25040 Easy Street, P.O. Box, Roseville, Mich.

For more data circle 643 on Reader Service Card

350 modern machine shop

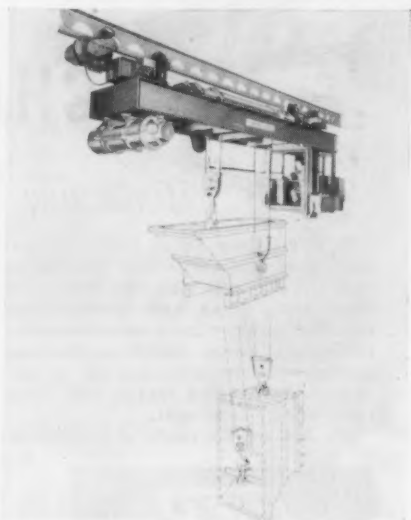
## new shop equipment . . .

Crane and Engineering Co., 6455 East 282nd St., Wickliffe, Ohio.

Of weatherproof construction for outdoor service, the unit will pick up tote boxes of materials, haul them and empty same by tipping. While the carrier was especially designed for handling slag in steel mills, it is suitable for a wide variety of materials such as castings, bolts, nuts and other machined parts, sand and various bulk materials.

Hoisting and travel motions are controlled by the cab operator. The main hoist alone raises or lowers a tote box in upright position. The hoist speed is 35 f.p.m. The travel speed is 250 f.p.m. Variable speed drum controllers are provided. The capacity of this unit is 12,000 pounds; that is, 6,000 pounds per hook. Other carriers of different capacities can be furnished.

For more data circle 155 on Reader Service Card



*Tramrail Carrier with dumping hoist*

November, 1957

## PORTABLE MARKING UNIT

A complete "marking department on wheels" has been designed and built by George T. Schmidt, Inc., 1806 West Belle Plaine Ave., Chicago 13, Illinois.

Designated as The Marking Cruiser, this unit contains every item necessary for hand stamping. It provides not only the tools, but the working area as well.

The unit contains a retractable stool, two hammers, absorber pad, a lamp mounted over the font case and a working anvil for easy sighting. Rubber tired casters are retractable for a firm stance when The Marking Cruiser is in use.

The font case contains four sizes of hand stamps: 1/16, 3/32, 1/8 and 3/16 inch of 40 characters each.

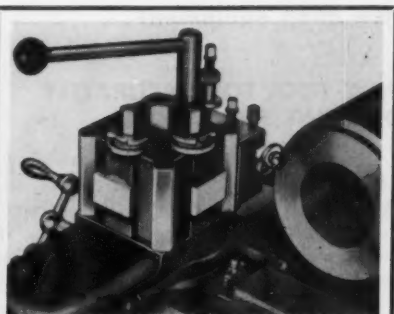
The size of this unit is 24 by 36 by 32 inches high.

For more data circle 156 on Reader Service Card



The George T. Schmidt Marking Cruiser

November, 1957



## MASTER MULTI TOOLHOLDER "BONI"

- Clamp with guaranteed accuracy of .0001"
- Adjust Cutters to proper height easily and quickly
- Make unlimited tool changes and operations with different tools
- Save considerable set-up time—up to 90%—in individual as well as production work

MODERNIZE YOUR LATHES!

PRODUCE MORE WITH GREATER PRECISION!

Five sizes available for center heights from 4" to 18"

Sole U.S.A. Representatives:

**NEISE**  
MODERNTOLS

**KARL A. NEISE**  
404 4th Ave., Dept. MMS  
New York 16, N. Y.

For more data circle 644 on Reader Service Card



## MIST COOLANT SYSTEMS

Graymills Mist Coolant Systems are corrosion proof. DUAL outlets are standard. Fine spray for maximum cooling and air economy. 1 and 2½ gal. sizes. Polyethylene containers show liquid level at all times. For drilling, tapping, milling, sawing and tool grinding jobs.

Write for new folder.

**THE GRAYMILLS CORPORATION**  
3769 N. Lincoln Ave., Chicago 13, Ill.

For more data circle 645 on Reader Service Card

modern machine shop 351

must be accurately drilled. Each Min-

## new shop equipment . . .

**TINY TOOL FOR ACCURATELY DRILLING SMALL HOLES**

Ritmar Corp., 183 New York Ave., Huntington, L. I. N. Y., has come out with a tiny tool, called the Mindril, for accurately drilling small holes in locations that would be inaccessible with conventional equipment.

Made of high grade tool steel and heat treated for strength and durability, the Mindril has been designed to hold individual drill sizes ranging from No. 80 to 57 or 1/64 and 1/32 inch. The drill number is clearly etched on the shaft for easy identification. Other important features of the Mindril are its concentricity and its uniform outside diameter (only 1/8 inch), which allows it to be used conveniently with drill bushings. It is ideal for precision drilling of instrument parts, on all



Ritmar Mindril shown here is a tiny tool for the accurate drilling of small holes

types of small, intricate mechanisms, for close center distances and in virtually any place where small holes

Developed  
For

**TOOL  
MAKERS**

Takes the place of expensive jigs and fixtures in connection with Milling, Drilling, Jig Boring, Grinding and Slotting.



MODEL CS-67

- Overall Height—1 1/2"
- Working Surface—5" dia., 3" hole
- Handwheel Reads to 1 min.

Price and Folder Upon Request

**CUSTOM SCIENTIFIC INSTRUMENTS, Inc.**

541 Devon St.

Kearny, N. J.

For more data circle 646 on Reader Service Card

352 modern machine shop

**BREMIL**

The IMPROVED Compound Lever Shears

ALL ALLOY  
FULLY  
GUARANTEED



Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.  
No. 2 cuts up to 1/4" steel plate.

**BREMIL MFG. CO.**

1020 Holland St., Erie, Pa.

For more data circle 647 on Reader Service Card

**CUT  
TOOL  
COSTS**

broken tools  
made like new again  
with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 4). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

**NO WELDING!**

**NO SLEEVES!**

**NO SHORTENING!**

**NO DISTORTION!**

Send them to us like this!

**GUARANTEED  
STRONG AS NEW!**

We return them like this!

Patent No. 2,712,004

**NU-TANGS INC.** 1339 Bates Avenue, Cincinnati 25, Ohio

For more data circle 648 on Reader Service Card

November, 1957



must be accurately drilled. Each Min-drill is protected from damage in shipment or on the shelf through individual packaging in a clear plastic tube with a metal screw on cap.

For more data circle 157 on Reader Service Card

★ ★ ★

### SOLENOID AIR VALVE FEATURES MANUAL ACTUATORS

The Beckett-Harcum Co., 1101 Wayne Rd., Wilmington, Ohio, has incorporated into its line of solenoid valve piloted air valves a feature which permits control and operation of the air cylinder without requiring the electric of the system to be functioning. These are twist type manual actuators and their use facilitates setup and try out of the mechanism. The manual actuators are offered as an optional feature. Beckett Solenoid Valve Piloted

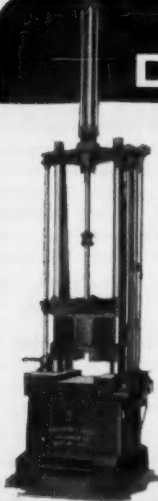


Beckett Solenoid Valve Piloted Valve

Valves, known as the Model BVP-1 (single solenoid) and BVP-2 (double solenoid), are full pressure piloted and are available in  $\frac{1}{8}$  to  $\frac{1}{2}$  inch sizes for use with air or other non-corrosive gas. They feature high speed operation, accurate control and low current demand.

For more data circle 158 on Reader Service Card

## PNEUMATIC DROP HAMMERS

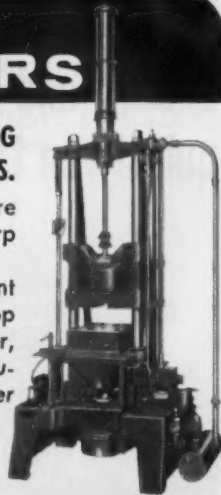


### EXCEL IN COLD SIZING AND PLANISHING OF STAMPINGS AND SMALL FORGINGS.

Particularly adapted to the manufacture of parts requiring fine finish and sharp contours.

More and more users of press equipment are discovering that Pneumatic Drop Hammers perform certain work better, faster and with greater economy. A Pneumatic Drop Hammer could be the answer to your difficult press problem.

TWO TYPES —  
STATIONARY ANVIL and DOUBLE ACTION



**PNEUMATIC DROP HAMMER CO.** 2000 Adams Street,  
Braintree 84, Mass.

For more data circle 649 on Reader Service Card

## new shop equipment . . .

**DRUMS AND BUCKETS ARE CORROSION RESISTANT**

A line of corrosion resistant drums and buckets, coated with Microsol vinyl plastisol, has been announced by the Coating Division, Michigan Chrome and Chemical Co., 8615 Grinnell Ave., Detroit 13, Michigan.

Coated inside and out with corrosion resistant Microsol, they are ideal for storing acids, caustics, plating solutions and all types of corrosives. They are just right to use when making up solutions, as the heavy Microsol coating will resist all corrosive action. Microsol is bonded to the steel and its extreme toughness makes it highly resistant to physical damage.

Drums are available in 30 and 55 gallon sizes with securely welded



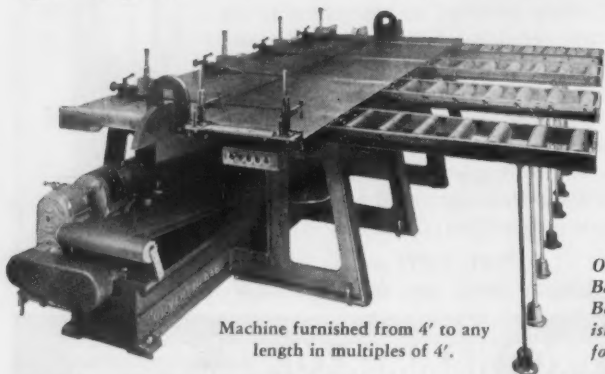
Michigan Corrosion Resistant Containers

handles for easier handling. They can also be ordered without the handles, if preferred that way. The buckets are 5 gallon containers.

For more data circle 159 on Reader Service Card

★ ★ ★ ★ ★

## Leading metal workers cut large nonferrous sheets and plates smoothly, quickly on this OLIVER Plate Saw



Machine furnished from 4' to any length in multiples of 4'.

The Oliver Plate Saw is successfully used in large aircraft plants to cut costs. Cuts large sheets or plates of aluminum up to 6" thick. Also copper, bronze, micarta and similar materials. Saw unit travels 1' to 40' a minute, returns 40' a minute. Cast iron tables each side of saw: 2½'x12'. Each table extension 18"x49" has 7 rollers.

Write for Bulletin 838.

Oliver makes Circular Saws, Band Saws, Shapers, Millers, Belt and Disk Grinders - Polishers, Spinning Lathes. Write for folders.

**OLIVER MACHINERY COMPANY**

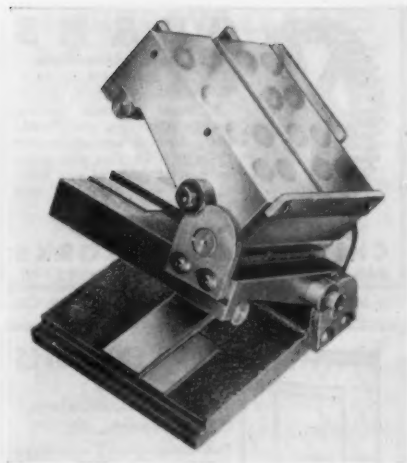
**GRAND RAPIDS 2, MICH.**

For more data circle 650 on Reader Service Card

## SINE PLATES HAVE DUAL FIELD MAGNETIC CHUCKS

Dual field permanent magnetic chucks, that allow each side to be magnetized or demagnetized independently, are now available on single and compound angle hinged sine plates manufactured by Bald Eagle Corp., 356 Cedar St., St. Paul 1, Minn. This feature allows the use of a surface gage on one side without disturbing the workpiece chucked on the other side. The manufacturer states that other advantages include changing workpieces without removing guides, using and removing a diamond dresser without disturbing the workpiece, and so on. A central tee slot between the chucks can be used to hold another guide to help position small pieces.

According to the manufacturer, the unusual flexibility of these sine plates, plus the powerful permanent dual magnets, makes them ideal for either



Bald Eagle Sine Plate with magnetic chucks

checking and inspection work or light machining operations.

For more data circle 160 on Reader Service Card

★ ★ ★ ★ ★

**NOW!** LATHE USERS  
CHANGE TOOLS  
in a ... **FLASH** ..

**ALORIS**  
QUICK CHANGE

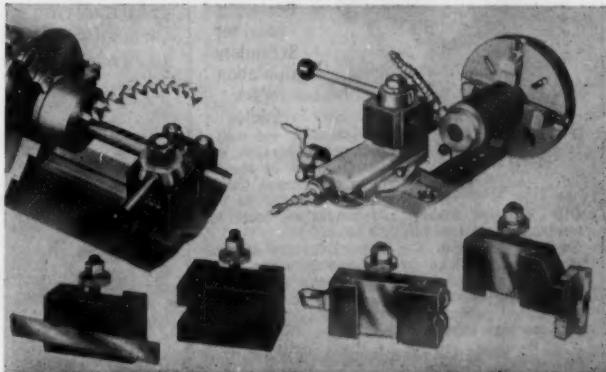
**TOOL POSTS & HOLDERS**

Speed Your Operation . . . Save You Money

Only a second to change tools for turning, facing, drilling, boring, threading, knurling, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
- RUGGED CONSTRUCTION.
- TESTED AND RECOMMENDED BY LEADING LATHE MANUFACTURERS.
- GREATER RIGIDITY.
- SAVES 90% IN SET-UP TIME.
- UNCONDITIONALLY GUARANTEED.

Write for catalog and price list.



**ALORIS TOOL CO., INC.** 419 GETTY AVENUE  
CLIFTON, NEW JERSEY

For more data circle 651 on Reader Service Card



## GEARS

**In Stock—Immediate Delivery**

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 20

### CHICAGO GEAR WORKS

440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 652 on Reader Service Card



## WAIDE ENVELOPES

**protect**  
Shop Orders, Drawings,  
Blueprints, Etc.

Two styles, No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

Write for details.

### WAIDE INSTRUMENT COMPANY

Dept. M, R.F.D. No. 1, Chardon, Ohio

For more data circle 653 on Reader Service Card

## SPEED UP DRILLING & TAPPING JOBS!



### JOHN'S DRILL JIG

- Self Centering
- Ideal for Secondary Operation Work Holding

For cross or end drilling round, hexagon, or square stock or standard or odd-shaped rough castings from 1/4" to 8" O.D. Will cut tooling and production costs to minimum for 10 to 100,000 pieces. Standard removable slip fit bushings and holders available to drill center or mean off-center. The self-centering action will hold within .0015" or better regardless of jig wear or piece part O.D. variation. Jigs available in three sizes 6", 8", 14"; jaw openings 2", 3 1/4", 7 1/4".

Write for complete information

## HEUSER MANUFACTURING CO.

1640 N. Paulina St. Chicago 22, Ill.

For more data circle 654 on Reader Service Card

356 modern machine shop

*new shop equipment . . .*

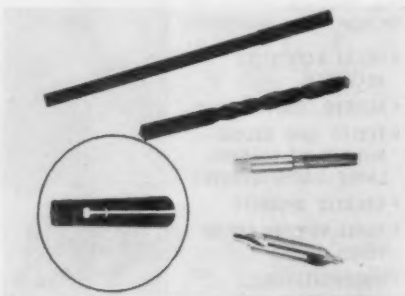
## STRAIGHT SHANK NYLON DRILL SLEEVE

Straight shank, Dupont nylon drill sleeves are now available from James Products Co., Mentor, Ohio. Drill sleeves made of Dupont nylon have now proven to be outstanding in reducing drill breakage, scored spindles and damaged chucks. Because of the nature of Dupont nylon, this sleeve will break under sudden shock and leave the drill in tact.

Morse taper o.d. sizes 1, 2 and 3 with a full range of inside diameter sizes are now in production.

The James Straight Shank Nylon Drill Saver is said to work equally well with taps, counterbores, deburring tools, end mills and similar straight shank tools. It is also ideal for holding center drills and countersinks. When used with a center drill, the possibility of marring the drill point is claimed to be eliminated. James Drill Savers are accurate to 0.002 in concentricity and are not subject to electrolytic corrosion. They are said to be unaffected by coolants, oil, gasoline or grease.

For more data circle 161 on Reader Service Card



James Drill Saver (inset) and various tools with which it can be used effectively

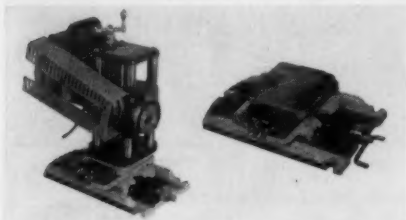
November, 1957

## FEED TABLE

A feed table, for use in providing feeds and slides for multiple combinations of metalworking, has been introduced by The Dumore Co., 1302 Seventeenth St., Racine, Wis. Called the Dumore Feed Table, this mechanical component is produced to give the company's Versa-Mil the ultimate in versatility of use, as well as to provide additional adjustments on standard machines and precision feeds and slides for jig or fixture setups.

The manufacturer claims that this tool is ideal for high production, automation setups and provides an easy, simple way to combine the Versa-Mil into continuous transfer operations. Four feed table sizes are available with longitudinal feeds varying from 8½ inches on the smallest to 42½ inches on the largest. Cross feed on all is 3¾ inches. The lead screw is calibrated to 0.001 inch. Hardened and ground, hand scraped ways are 6 inches wide. Tapered gibs are standard. A connecting hand lever provides manual feed. Hydraulic, pneumatic cylinder or electrically powered unit is readily added to provide automatic feed. When necessary to machine close to the surface on which the feed table is supported, the lower carriage may be removed to reduce the height from 3-5/16 to 1-11/16 inches, providing one direction of travel only.

The company states that by using Dumore Feed Tables with the Dumore



Dumore Feed Table for use with Versa-Mil

November, 1957

## HARGRAVE CLAMPS

Complete Line of Clamps for all Purposes

Individually  
Power Tested  
for Better  
Performance.



"C", Steel Bar,  
Quick Acting,  
Wood Hand  
Screws, Welders

### WRITE FOR FREE CATALOG.

Showing Clamps, Chisels, Punches, Masonry Drills for hand and power hammers, Carbide Drills, Washer Cutters, and File Cleaners.

Stocked by Your Local Distributor.

**THE CINCINNATI TOOL COMPANY**

1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle 655 on Reader Service Card



**READ  
ABOUT  
IT**

**Comet.  
BORING TOOLS**

(H.S.S. and Carbide)

for Holes from  
1/16" upward

STANDARD AND SPECIAL BORING, FACING  
& INTERNAL THREADING TOOLS. Write for Data

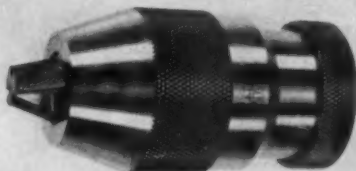
Bore Small Holes? Contact COMET



**COMET Tool Co.**

738-52 Broadway, New York 3, N. Y.

For more data circle 656 on Reader Service Card



## THE RAPID

A Superior Swedish Drill Chuck

For the finest JIG BORERS

or other machines

WHEREVER UTMOST AVAILABLE

ACCURACY COUNTS

- Automatic tightening and self centering with load
  - Easy to open—No Key to misplace or to invite accidents
  - No chewed up tool shanks
  - All parts properly hardened and Precision Ground
  - Arbors Precision Ground between centers
- The Chuck of TODAY for the most demanding operators!

Sole U.S.A. Representatives

**NEISE  
MODERN TOOLS**

**KARL A. NEISE**  
404 4th Ave., Dept. MMS  
New York 16, N. Y.

For more data circle 657 on Reader Service Card

modern machine shop 357

**new shop equipment . . .**

Versa-Mil, the metalworking user can gain the advantage of being able to feed the machine to the work.

For more data circle 162 on Reader Service Card

★ ★ ★

### **DRUM TOP MACHINE TOOL SUMP CLEANER**

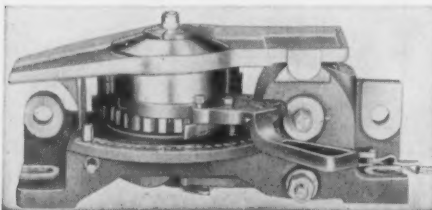
Coolant Equipment Corp., Verona, Wis., recently introduced the Model AXO lightweight, air operated, drum top machine tool sump cleaner, which is the smallest unit in the company's air operated RedTop Series. Weighing only 33 pounds, the self-sealing lid is easily transferred from drum to drum.

The compact unit develops 275 inches water suction to thoroughly clean chips, oils, coolant and sludge from machine tool sumps. The Model



**RedTop AXO Machine Tool Sump Cleaner**

AXO cleans at the rate of 30 to 50 gallons per minute and eliminates all



### **DEARBORN Automatic Chucking and Indexing Fixture**

#### **FEATURES:**

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from 1/32" to 2".

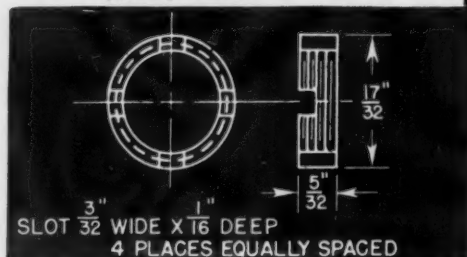
**J. W. DEARBORN**  
ANSONIA • CONN.

Write for illustrated data. Send blue-prints or specifications of work.



## **1200 PIECES PER HOUR**

This piece was made from brass rod and slotted as shown in the print below. Production on this item was 1,200 pieces per hour.



For more data circle 658 on Reader Service Card



mess and oil spillage. This air operated pump has no moving parts, thereby reducing maintenance and service to a minimum. For best operation,  $\frac{3}{8}$  inch air service at 80 to 120 pounds line pressure is required. The unit is well muffled for quiet operation and fits standard open top 55 gallon drums. A drum dolly is optional.

For more data circle 163 on Reader Service Card

★ ★ ★

### HYDRAULIC PRESS AVAILABLE IN 25, 50, 75 AND 150 TON CAPACITIES

An air operated hydraulic shop press, recently announced by the Dake Corp., 612 Seventh St., Grand Haven, Mich., is available in four tonnage capacities — 25, 50, 75 and 150 ton models.

This press has been designed to find many applications in a wide range of



*Dake Air Operated Hydraulic Shop Press features rapid approach of the ram*

★ ★ ★ ★ ★

Something **NEW** for PRECISION LAYOUT WORK

## \* MICRO-SCALE

- TEMPLATE MAKER
- TOOL AND DIE
- GAGE MAKERS
- LAYOUT MAN
- DRAFTSMAN
- ENGINEERS
- DESIGNERS

SCALE  
LENGTHS  
AVAILABLE  
6" 12" 18" 24"

A low-cost precision tool of simple and trouble-free design, for setting dividers, trammels, or compasses to any radius or size within the range of the tool in increments of .001 of an inch.

USES: Comparator templates—Precision drawing magnifications (blow-ups)—Tool and diemaking radii layout—Complex trigonometric problems of angles and radii blends avoided with accurate blow-up layouts—Measurement of shallow flat detail with divider points and checking on tool for dimension—Inspection and rechecking of layouts.

\* Write for  
Brochure  
and Price List

MANUFACTURED BY  
**TRICO MACHINE PRODUCTS CORP.**  
2664 GRAND AVENUE CLEVELAND 4, OHIO

For more data circle 659 on Reader Service Card

**new shop equipment . . .**

different manufacturing fields. It is excellent for bending, straightening and other press work that must be completed in minimum time at a reasonable price. The only requirement for operation is the availability of compressed air.

One feature of special interest is the rapid ram approach which eliminates the use of a handwheel. When the control knob is turned, the ram advances at high speed until it comes into contact with the work, then automatically changes to the power stroke. The knob automatically turns to "off" when the hand is removed. All controls and gages are placed at convenient working height in a streamlined control panel.

The workhead is completely self-contained and is readily movable (on

roller bearings) to center over the work. The ram has a full 10 inch stroke. The workhead unit may also be purchased separately.

Other important features are the rigid, arc welded steel reinforced frame; the safety valve that protects against overload; and the adjustable table.

For more data circle 164 on Reader Service Card

★ ★ ★

**SINGLE WHEEL CODE PRINTER**

A Single Wheel Code Printer has been designed by the Pannier Corp., 202 Sandusky St., Pittsburgh 12, Pa., for hand operation or for mounting on a continuous conveyor line. Either way, clean, clear marking is assured on any absorbent or non-absorbent surface; friction bands on the printing wheel minimize any possibility of smudged impressions. This code print-

★ ★ ★ ★ ★

**CONTINENTAL Certified DRILLS**



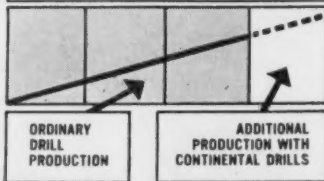
# RUGGED

Today's drilling problems on both standard and new metals require twist drills with *something extra* built into them. That's why Continental drills are so acceptable to leading *cost conscious* production plants.

Ask your industrial jobber

**MORE HOLES PER DRILL**

**MAJOR PRODUCTION PLANTS PROVE CONTINENTAL DRILLS LAST LONGER!**



NEW YORK  
50 Church Street  
CO 7-5662

**WAREHOUSES:**

LOS ANGELES  
6551 Whittier Blvd.  
RA 3-1287

TACOMA, WASH.  
2006 Center Street  
MA 7-3434



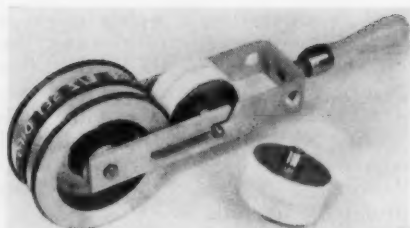
## CONTINENTAL DRILL CORPORATION

555 W. Adams St., Chicago 6, Illinois

LET  
COUNT MORE HOLES  
SHOW YOU HOW  
TO CUT COSTS



For more data circle 660 on Reader Service Card



**Pannier Single Wheel Code Printer**

er accommodates E-Z Set Type for fast type changing. Simply press the type on and strip off. The 4, 6 or 8 inch wheels handle type characters in all sizes from 1/16 to 1 inch.

This versatile Master Marker is equipped with a foam rubber ink fountain that affords long runs before reinking is necessary. This means fewer slow downs and less time wasted. The ink fountain has been engineered for easy and quick changing to

permit the using of extra fountains with different colored inks. The interchangeability of ink fountains makes color coding practical.

Because of its lightweight aluminum construction, the entire unit weighs only four pounds, including detachable handle, E-Z set wheel and type.

For more data circle 165 on Reader Service Card

★ ★ ★

## PERMANENT MAGNETIC CHUCK

The O. S. Walker Co., Inc., Worcester 6, Mass., has announced a permanent magnetic chuck, designated as the No. 824, with a work surface 8 1/4 inches wide by 24 inches long.

The ceramic magnets used have many times the coercive force of alloy magnets. Bar poles, only 1/4 inch wide, give uniform holding over the entire chuck top, with unusual workholding ability even on very thin parts. Sec-



- *Centerless Ground to extreme accuracy. Special new-type Equipment, assures concentric chamfered or formed ends—no cut-off burrs.*

**Dowel - Straight - Countersunk - Angle Ends**  
 .020" to .1875" Diameter  
 .125" to 2" Length

### Precise Specifications

Accurately met. If requested on order, surface analyses tape, showing typical surface in micro-inch measurements, is furnished. Tape magnifies 39,370 times.

**Small orders or volume production to your exact specifications.**

**Quality Precision Work!**  
**Prompt Deliveries!**  
**Prices you will like!**  
**SEND US PRINTS FOR QUOTATION**

## COMMERCIAL CENTERLESS GRINDING COMPANY

6605 CEDAR AVE., CLEVELAND 3, OHIO  
 Phone: ENdicott 1-3412

For more data circle 661 on Reader Service Card

## new shop equipment . . .



Walker No. 824 Permanent Magnetic Chuck

ondary external fields are cancelled to prevent magnetism from entering the machine table or ways.

In the "off" position, the chuck is completely magnetized.

The No. 824, plus the other chucks in this line, are entirely suitable for holding work for milling and planing. When milling or planing, the cutting

tool is automatically subjected to a demagnetizing influence during the cutting cycle, because the magnets are polarized horizontally rather than vertically. This is claimed to allow free cutting without chip interference and eliminates the danger of scored surfaces and broken cutters, resulting from chip adherence.

For more data circle 166 on Reader Service Card

★ ★ ★

### GRINDING WHEEL GAGE PROVIDES FAST AND NON-DESTRUCTIVE UNIFORMITY TEST

Extended tests by manufacturers and users of grinding wheels are claimed to indicate that a Sheffield Air Gage is making possible the effective, non-destructive comparative tests of density uniformity in grinding wheels, honing sticks and other abrasive tools and products. This gage is manufac-

 A tube of Standard Die Makers Grease with a black cap and a label that says "DIE MAKERS GREASE" and "Standard".
 

**TRY**  
**"Standard"**  
**DIE MAKERS**  
**GREASE AT OUR EXPENSE!**

By actual independent laboratory test, this grease has proved to have lubricating qualities unequalled by any other lube. Write on your company letterhead for FREE sample tube.

**STANDARD DIE SET MFRS., INC.**  
 1503 Elmwood Ave., Providence 7, R. I.

### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from  $\frac{1}{8}$ " to  $\frac{3}{4}$ " U.S.S. Inexpensive — Last for years.



Write for Circular  
**NIELSEN TOOL & DIE COMPANY**  
 17360 Lahser Road, room 202  
 Detroit 19, Michigan

For more data circle 662 on Reader Service Card

### "SEALFLEX" TUBING



**Leakproof—**  
**Stays In place**  
**For Coolants, Cutting**  
**Oils, Solvents**

Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in  $\frac{1}{8}$ "  $\frac{1}{4}$ "  $\frac{3}{8}$ "  $\frac{1}{2}$ "  $\frac{3}{4}$ " I.D. Write for bulletin and prices.

**VERMONT FLEXIBLE TUBING CO.**  
 Lyndonville, Vermont

For more data circle 663 on Reader Service Card



Testing the uniformity of an abrasive grinding wheel with a Sheffield Air Gage

tured by The Sheffield Corp., Dept. 12, Dayton 1, Ohio.

The gage, consisting of either a three or four column Precisionaire, flows air into the grinding wheel and gages the flow by means of scale graduations, known as the Sheffield index.

While graduations have no relationship to abrasive grain sizes, the gage quickly and accurately compares and checks uniformity.

This gage detects filling and provides an accurate method of exploring structural variations. It enables machine tool builders and users of grinders to select highly uniform wheels for super precise grinding jobs where wheels of varying density would be entirely unsuitable.

For more data circle 167 on Reader Service Card

★ ★ ★

## VERTICAL MILLER WITH AIR FEED

The Duff Machine Co., 31 Wingate St., Haverhill, Mass., has announced that its vertical miller can now be obtained with Bellows Air Feed to the longitudinal travel of the table.

There are many variations of this feature. The one shown in the accompanying illustration has a 12 inch dou-

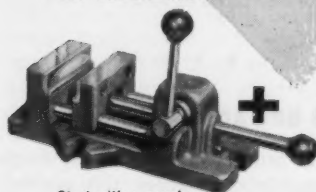
★ ★ ★ ★ ★



HERE IS JUST ONE OF  
THOUSANDS  
OF APPLICATIONS

## heinrich *Grip-Master* HOLDING DEVICES

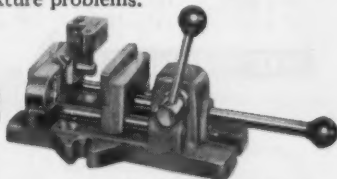
speed production and cut tooling costs up to 75% and occasionally more. One glance at the example below will tell you why more and more cost conscious tool designers, nation-wide, start jigs and fixtures with a Heinrich Grip-Master. It's the easy way to solve your jig and fixture problems.



Start with a speedy  
Grip-Master vise and fixture base.



Simply add false jaws  
and bushing plate.



Result... an accurate,  
precision-built, low-cost jig.

WRITE FOR FREE CATALOG

**HEINRICH TOOLS, Inc., Dept. 117-L, Racine, Wis.**

For more data circle 664 on Reader Service Card

## For Precision Checking of



### USE SUNDSTRAND BENCH CENTERS

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

#### Complete Range as Follows:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

#### FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 585.



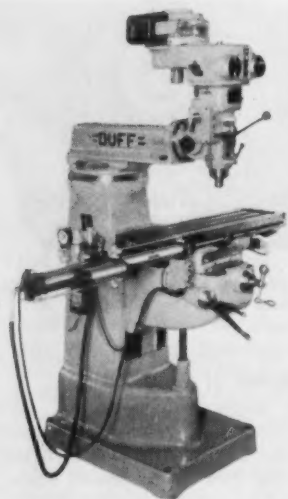
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### ROUND BROACHES

Round, push type broaches, originally developed to meet the aircraft industry's precision requirements, are now available as standard, off the shelf items from The duMont Corp., Greenfield, Mass. These stock broaches

November, 1957





duMont Round Broach is available in 13 sizes

provide unusual speed, convenience and economy in making round holes which must be held to close tolerances and must be perfectly straight all the way through.

Round broaches can be used with the shop arbor press or with a hydraulic press. They begin where reamers leave off. They eliminate chatter marks, rings and run out. No special tools are required and they finish to the exact size in one pass. The company has these round broaches available in 13 sizes.

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## NEW FEATURES INCORPORATED INTO RADIAL DRILL

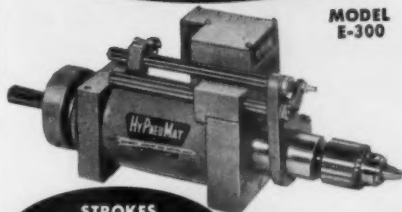
The I. O. Johansson Co., 7248 St. Louis Ave., Skokie, Ill., has announced that four new features have been incorporated into the design of its ram type radial drilling machine. Equipped for deep hole drilling, holes up to 18 inches in depth can be drilled with this machine. With the new compound angle attachment, holes on any compound angle can also be drilled by rotating the drill head in two planes. An automatic drill ejector permits quick tool changes. The drill press can be converted instantly to a semi-automatic tapping machine.

This machine has a drilling area of 14.8 square feet and handles workpieces over 4 feet high and over 4 feet in diameter. The drill head can be brought to within 5 inches of the col-

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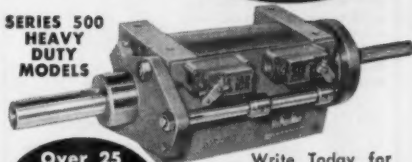


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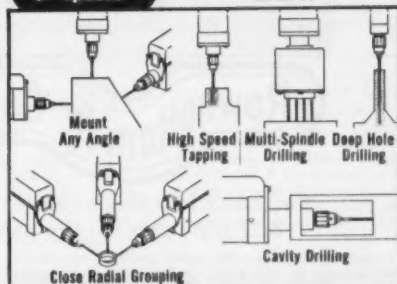
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**HYPNEUMAT, INC.**  
647 W. Virginia Street, Milwaukee, Wis.

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November, 1957

modern machine shop 365

**new shop equipment . . .**



**Johansson Ram Type Radial Drilling Machine**

umn or can be moved out to drill to the center of a 52 inch circle. The distance from the spindle nose to the workpiece can be varied from 3½ to 52 inches. The machine has a 20 by 28 inch table with a coolant trough and three ½ inch tee slots. A work pad at the rear of this machine measures 18 by 21 inches and is also constructed with three ½ inch tee slots.

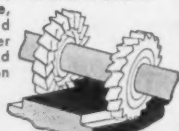
The complete ram and head assembly rotates 360 degrees on the column. The column has a vertical movement of 12 inches. Elevation of the column can be accomplished either by hand crank or by a power unit. Hand locks or an automatic locking mechanism are available for locking the ram travel. The completely gear driven drill head provides spindle speeds from 78 to 1,200 r.p.m. and allows speed selection while the machine is running. Drills up to 1¾ inches in diameter can be used.

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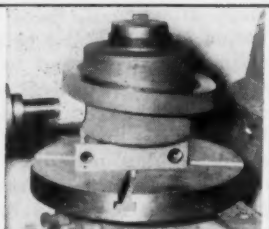
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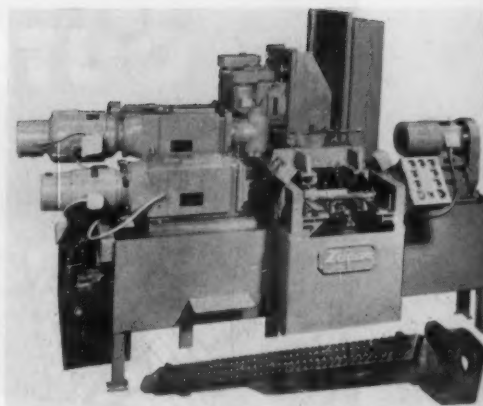
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Zagar, Inc., 23898 Lakeland Blvd., Cleveland 23, Ohio, has introduced a compact, seven station transfer machine for machining gas burners prior to drilling holes. The use of standard tooling in the machining sequence that follows suggests the adaptability of this type of equipment for other parts production.

This machine drills, reams, taps, mills and spotfaces as follows. At station one, two holes, one at each end of the burner, are spotfaced. One is reamed and one is drilled. At station two, face milling, bottom face, flange end. At station three, two holes are drilled horizontally and one hole is drilled in the top by a vertically mounted drill head. The holes drilled at station three are then tapped at station four. At station five, slot milling, one on each side at either end of the burner, is done simultaneously. Two stations, one for load and another for unload, account for the seven total stations.

Movement of the burner from one station to another is done by transfer bar. Movement is continuous, hydraulically actuated and interlocked.

The first, second and fifth stations use standard Zagar cam feed drill units. The third and fourth stations have standard Zagar gearless drill heads. The entire installation is auto-



Zagar Multi-Operation Transfer Machine

matic, with opportunity to automate loading and unloading. Production is rated at 180 burners per hour at 80 per cent efficiency.

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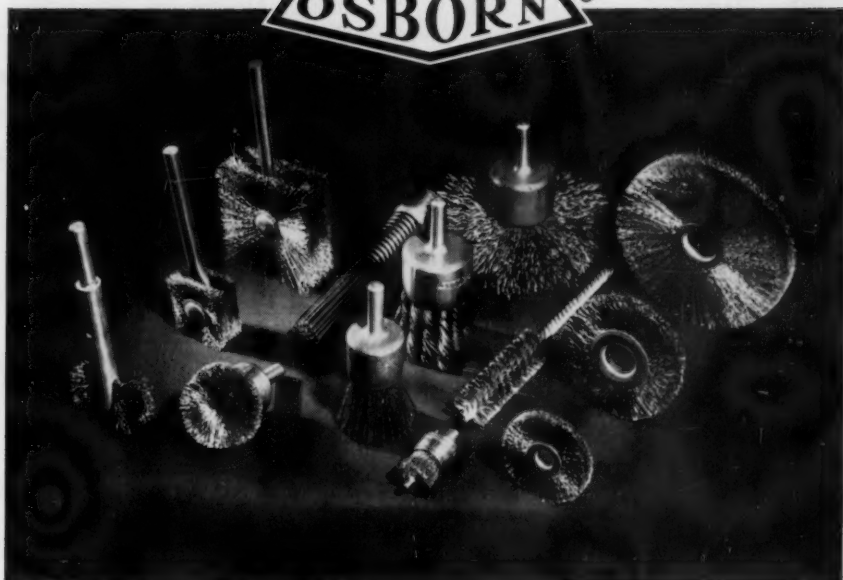
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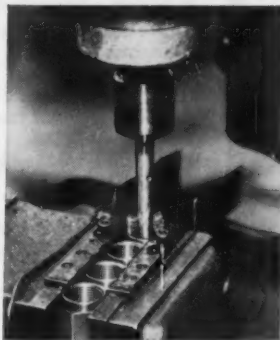


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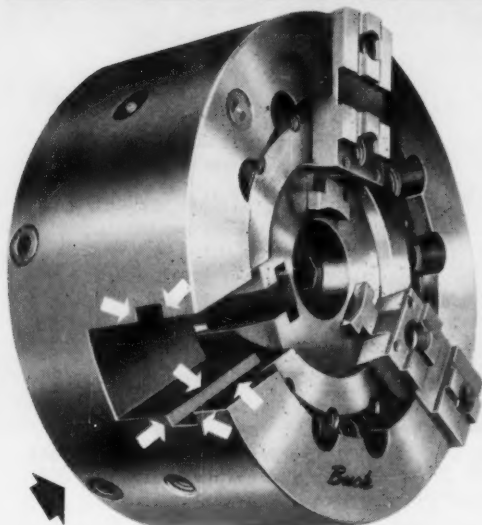
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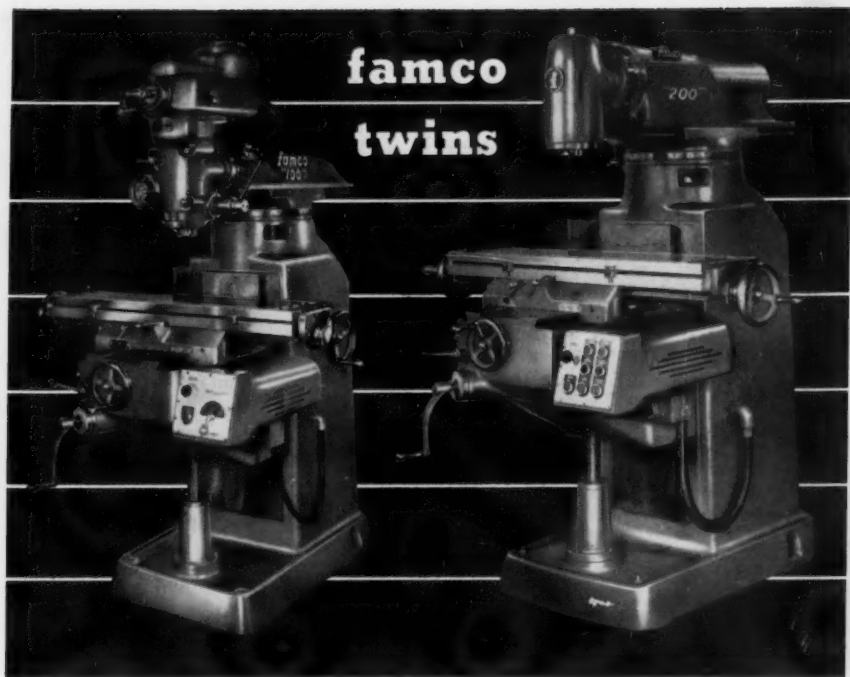
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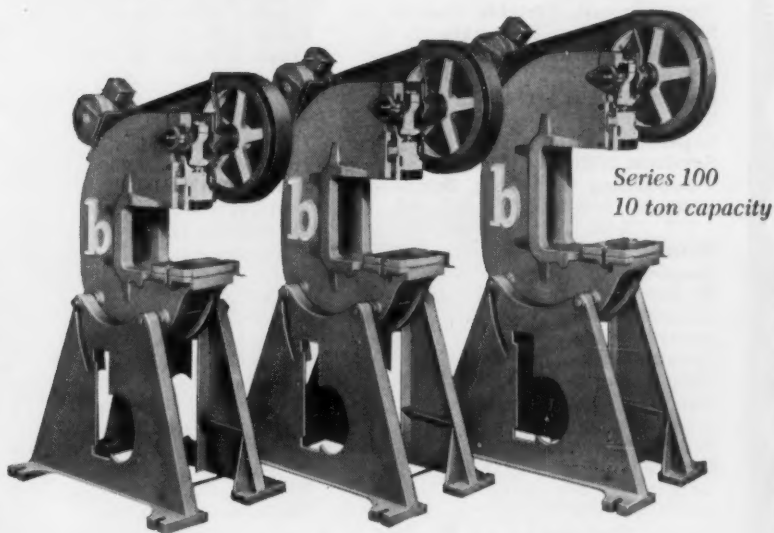
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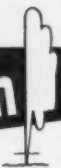


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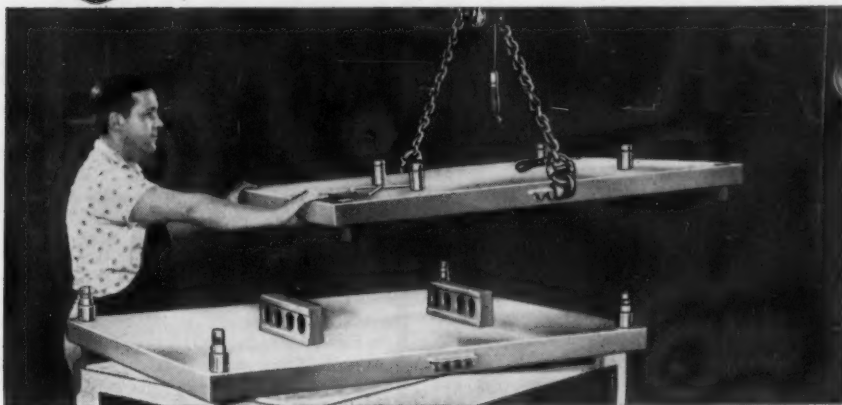
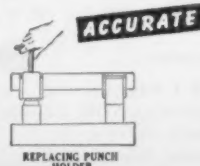
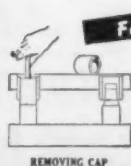
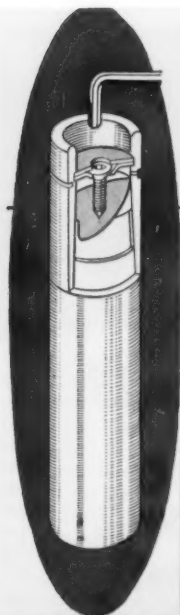


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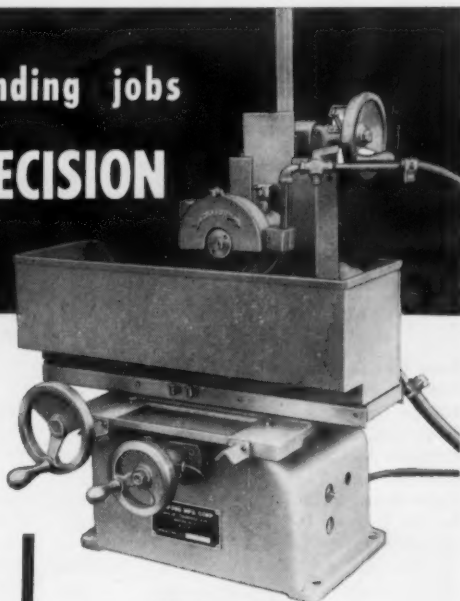
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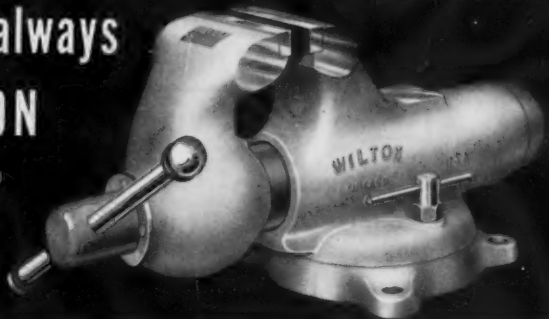
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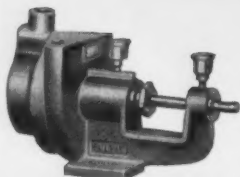
November, 1957

modern machine shop 387

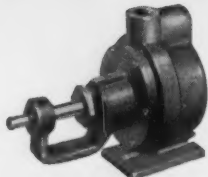
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## pick your pump from the **fulflo** line of centrifugal coolant pumps

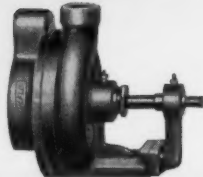
Pick your coolant pumps for performance *and* low cost . . . initially and over the long run. A Fulflo coolant pump is a "cool" choice for dependable coolant delivery.



**Model PS4**  
1800 to 2600 rpm  
3½ to 5 gpm



**Model KGTS4**  
1600 to 2400 rpm  
12 to 16 gpm



**Model FS4**  
1800 to 2400rpm  
35 gpm at 1800rpm



**Model 2ES4**  
1600 to 2400 rpm  
10 to 30 gpm



**Model FMS**  
Vertical or  
Horizontal  
¼ hp; 30 gpm  
flange mount



**Model AGM**  
¼ to 1 hp sizes

### FULFLO DIRECT-CONNECTED

- Can be arranged for belt drive
- Right or left rotation
- Self-contained priming chamber
- Automatic packing adjustment
- Hardened steel sleeve shaft
- Pipe sizes ¾" to 1½"

### FULFLO MOTOR-DRIVEN

- Special motors with heavy duty ball bearings, totally-enclosed, splash-proof frame
- Centrifugal action insures pumping regardless of chips or grit
- For practically any type of installation



*Write for your  
copy of  
"Fulflo Pumps  
Mechanical Data Book"*

**THE FULFLO  
SPECIALTIES CO., Inc.**  
416 Fancy Avenue  
Blanchester, Ohio

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↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

# READER SERVICE CARD

November 1957 issue

RETURN BY JANUARY 1, 1958.  
WRITE TO MANUFACTURER DIRECT

Your Name \_\_\_\_\_ Your Title \_\_\_\_\_  
 Company Name \_\_\_\_\_  
 Company Address \_\_\_\_\_  
 City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

modern  
machine  
shop

Products Manufactured \_\_\_\_\_ Number of Plant Employees \_\_\_\_\_  
 431 Main Street Cincinnati 2, Ohio

431 Main Street  
Cincinnati 2, Ohio

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

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1	31	61	91	121	151	181	211	241	271	301—Front Cover	435	465	495	525	555	585	615	645	675
2	32	62	92	122	152	182	212	242	272	302—Inside Front Cover	436	466	496	526	556	586	616	646	676
3	33	63	93	123	153	183	213	243	273	303—Inside Back Cover	437	467	497	527	557	587	617	647	677
4	34	64	94	124	154	184	214	244	274	304—Back Cover	438	468	498	528	558	588	618	648	678
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**BUSINESS REPLY CARD**

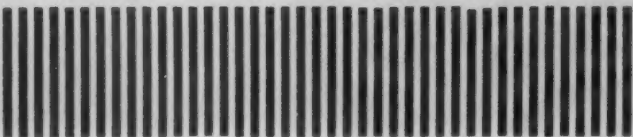
*No Postage Stamp Necessary if Mailed in the United States*

**4c POSTAGE WILL BE PAID BY—**

**modern  
machine  
shop**

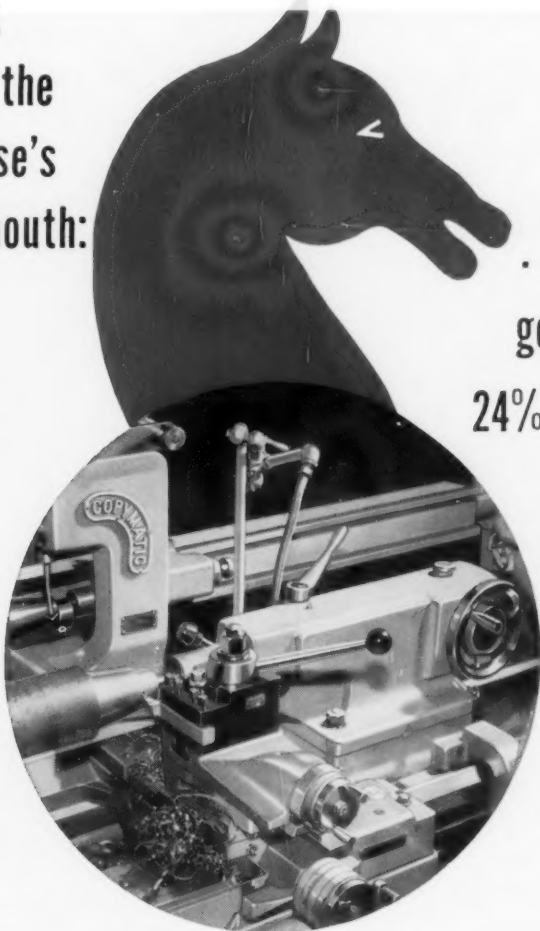
**431 MAIN ST.  
CINCINNATI 2, OHIO**

**FIRST CLASS  
PERMIT No. 1702  
CINCINNATI, OHIO**



RE  
Yo Co Co Ch Pro

straight  
from the  
horse's  
mouth:



... "a very  
good machine ...  
24% time saved!"

**W**HEN a famous machine tool manufacturer reports on the performance of another's product, it is an opinion you can count on as authoritative.

The Ingersoll Milling Machine Company of Rockford, Illinois, is one of the early owners of a new Lodge & Shipley 16" POWERTURN 90° COPYMATIC Lathe. Used in turning cutter housings and shanks, shafts and spindles, the lathe has proved very good,

judged on performance, construction, accuracy and versatility.

If you want eye-witness proof of similar significant savings on your lathe production, the Lodge & Shipley Demonstration Room is at your service. Contact your Lodge & Shipley distributor for details or write direct to: The Lodge & Shipley Co., 3058 Colerain Ave., Cincinnati 25, Ohio.

#### JOB FACTS

**WORKPIECE:** 4" Diameter Cutter Housing  
**OPERATION:** Turn complete including taper  
**MATERIAL:** 4140 HR Steel  
**CUTTING TOOLS:** Carbide  
**FEED:** .018" per rev.  
**SPEED:** 431 RPM  
**TIME:** Floor-to-Floor: approx. 35 min.  
**RESULTS:** 24% time saved

## Lodge & Shipley

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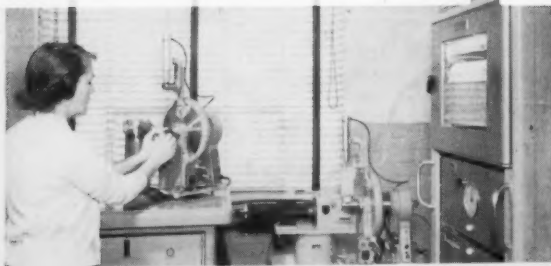
IN QUALITY



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FEED: .018" per rev.  
SPEED: 431 RPM  
TIME: Floor-to-Floor: approx. 35 min.  
RESULTS: 24% time saved

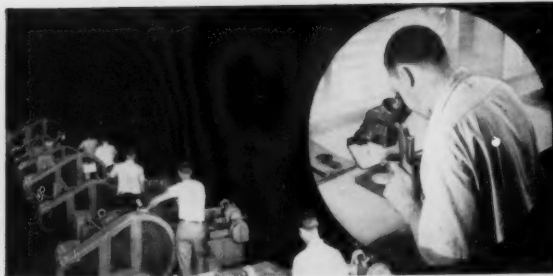
For more data circle 303 on R



## IN QUALITY

This X-ray spectrograph makes a complex analysis of our alloy steel... does it faster and far more accurately than previous methods.

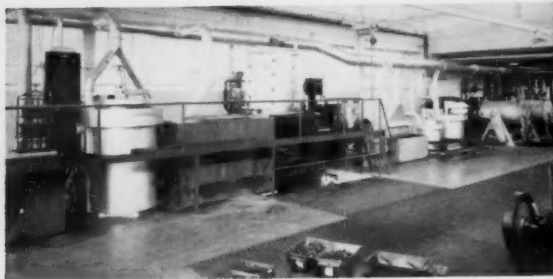
## Holo-Krome socket screws



## IN PRECISION

New and revolutionary Holo-Krome forging methods give added strength and improved appearance to socket screws.

when your products demand the best!



## IN KNOW-HOW

In this showpiece of industry, the most modern hardening furnaces. Not readily seen but equally present—years of skill and experience as socket screw specialists.

**LOOK TO HOLO-KROME  
FOR THE FINEST IN SOCKET SCREWS...  
FOR UNMATCHED SAME-DAY SERVICE!**



**HOLO-KROME  
SOCKET SCREWS**



THE HOLO-KROME SCREW CORP. • HARTFORD 10, CONN., U. S. A.

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